Linda Bourque

Prepared for
Devonshire Associates, Inc.
630 Third Avenue
New York, NY 10017

Draft Environmental Impact Report for

DEVONSHIRE TOWERS

hmm
HMM ASSOCIATES, INC.

Draft Environmental Impact Report

for

DEVONSHIRE TOWERS

MAY 1979

PREPARED FOR:
DEVONSHIRE ASSOCIATES, INC.
630 THIRD AVENUE
NEW YORK, NY 10017

HMM ASSOCIATES, INC.

TABLE OF CONTENTS

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

ENVIRONMENTAL NOTIFICATION FORM

Do not write in this space

I. SUMMARY

A. Project Identification
1. Project Name Devonshire Towers
2. Project Proponent Devonshire Associates
Address 630 Third Avenue
New York, NY 10017

B. Project Description: (City/Town(s) Boston, Massachusetts
1. Location within city/town or street address 250 Washington Street
2. Est. Commencement Date: September, 1979 Est. Completion Date: April, 1982
Approx. Cost $ 30 million Current Status of Project Design: 25 % Complete

C. Narrative Summary of Project
Describe project and give a description of the general project boundaries and the present use of the project area. (If necessary, use back of this page to complete summary).

The project area is located on Washington and Devonshire Streets, in the block bounded by Water and State Streets, in downtown Boston. The present use of the project area is as a surface parking lot. The area of the project site is approximately 0.5 of an acre.

The project which Devonshire Associates proposes to build is identified as Devonshire Towers and will consist of a forty story building with three levels of parking underground for approximately 150 automobiles. The ground level floor of the building will be devoted to approximately 10,000 square feet of retail space. The second through sixth floors will be devoted to approximately 100,000 square feet of office space. The seventh floor will house the mechanical equipment of the building. The remainder of the building (32 floors) will be devoted to approximately 480 market rate residential apartment units, with the top floor devoted to recreational facilities (health club). The building will be set back beginning at the ninth floor so that the building line will conform to the neighboring structures. There will be a landscaped deck on the roof of the seventh floor and on the roof of the building as well as appropriate ground level landscaping. A ground level pedestrian walkway connecting Washington and Devonshire Streets will be provided.

Copies of this may be obtained from:
Name: Marc D. Cumsky Firm/~~Agency~~: Fine & Ambrogne
Address: 133 Federal Street, Boston, Mass. 02110 Phone No. (617) 482-0100

1979 THIS IS AN IMPORTANT NOTICE. COMMENT PERIOD IS LIMITED.
For Information, call (617) 727-5830

Use This Page to Complete Narrative, if necessary.

This project is one which is categorically included and therefore automatically requires preparation of an Environmental Impact Report : YES x NO ______

D. Scoping (Complete Sections II and III first, before completing this section.)

1. Check those areas which would be important to examine in the event that an EIR is required for this project. This information is important so that significant areas of concern can be identified as early as possible, in order to expedite analysis and review.

	Construction Impacts	Long Term Impacts		Construction Impacts	Long Term Impacts
Open Space & Recreation			Mineral Resources		
Historical		x	Energy Use		x
Archaeological			Water Supply & Use		x
Fisheries & Wildlife			Water Pollution		
Vegetation, Trees			Air Pollution	x	x
Other Biological Systems			Noise	x	
Inland Wetlands			Traffic	x	x
Coastal Wetlands or Beaches			Solid Waste	x	x
Flood Hazard Areas			Aesthetics	x	x
Chemicals, Hazardous Substances, High Risk Operations			Wind and Shadow		x
			Growth Impacts		
Geologically Unstable Areas			Community/Housing and the Built Environment		x
Agricultural Land					
Other (Specify)					

2. List the alternatives which you would consider to be feasible in the event an EIR is required.

A "no-build" alternative would result in the maintaining of an existing eyesore. There are no apparent benefits to this alternative, and, indeed, it could lead to deterioration and blight in the upper Washington Street area. Smaller scale projects are not economically viable. A strict retail/office structure would eliminate an innovative aspect of the project: the creation of downtown residential housing units in an area presently used almost exclusively for office and retail purposes.

E. Has this project been filed with EOEA before? Yes ______ No x
If Yes, EOEA No. __________ EOEA Action? __________

F. Does this project fall under the jurisdiction of NEPA? Yes ______ No x
If Yes, which Federal Agency? __________ NEPA Status? __________

G. List the State or Federal agencies from which permits will be sought:

Agency Name | Type of Permit

It is not anticipated that any state or federal permits will be required, except perhaps a sewer connection permit from the Division of Water Pollution Control.

H. Will an Order of Conditions be required under the provisions of the Wetlands Protection Act (Chap. 131, Section 40)?
Yes ______ No x

DEQE File No., if applicable: __________

I. List the agencies from which the proponent will seek financial assistance for this project:

Agency Name	Funding Amount
Dept. of Housing & Urban Development	$27 million of Sec. 221(d)(4) mortgage insurance.
Boston Redevelopment Authority	c. 121A agreement is being sought.

II. PROJECT DESCRIPTION

A. Include an original 8½x11 inch or larger section of the most recent U.S.G.S. 1:24,000 scale topographic map with the project area location and boundaries clearly shown. Include multiple maps if necessary for large projects. Include other maps, diagrams or aerial photos if the project cannot be clearly shown at U.S.G.S. scale. If available, attach a plan sketch of the proposed project.

B. State total area of project: 21,500 square feet (0.5 of an acre)
Estimate the number of acres (to the nearest 1/10 acre) directly affected that are currently:

1. Developed .... 0.5 acres
2. Open Space/Woodlands/Recreation no acres
3. Wetlands .... no acres
4. Floodplain .... no acres
5. Coastal Area .... no acres
6. Productive Resources
   - Agriculture .... no acres
   - Forestry .... no acres
   - Mineral Products .... no acres

C. Provide the following dimensions, if applicable:
Length in miles n/a Number of Housing Units 480 Number of Stories 40

	Existing	Immediate Increase Due to Project
Number of Parking Spaces	75	75
Vehicle Trips to Project Site	75	75-150

Estimated Vehicle Trips past project site unknown at present time

D. If the proposed project will require any permit for access to local or state highways, please attach a sketch showing the location of the proposed driveway(s) in relation to the highway and to the general development plan; identifying all local and state highways abutting the development ; and indicating the number of lanes, pavement width, median strips and adjacent driveways on each abutting highway. and indicating the distance to the nearest intersection.

The project does not abut any local or state highways.

I. ASSESSMENT OF POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS

Instructions: Consider direct and indirect adverse impacts, including those arising from general construction and operations. For every answer explain why significant adverse impact is considered likely or unlikely to result.

Also, state the source of information or other basis for the answers supplied. If the source of the information, in part or in full, is not listed in the ENF, the preparing officer will be assumed to be the source of the information. Such environmental information should be acquired at least in part by field inspection.

A. Open Space and Recreation

1. Might the project affect the condition, use or access to any open space and/or recreation area?
Yes ____ No __x__

Explanation and Source:

The proposed project is not adjacent to or within the vicinity of any existing open space or recreation area. Indeed, the project contemplates the construction of landscaped open decks on the top of the seventh floor roof and on the top of the building. In addition, the top floor of the building will be devoted to recreational facilities (pool, gym, exercise room, steam room).

B. Historic Resources

1. Might any site or structure of historic significance be affected by the project? Yes ____ No __x__

Explanation and Source:

Although the Old State House is located near the project area, preliminary shadow studies indicate that shadows created by the project will not add to the shadowing of that structure presently created by existing buildings.

2. Might any archaeological site be affected by the project? Yes ____ No __x__

Explanation and Source:

No known archeological site is located on or in the vicinity of the project area, or will be affected by the project.

C. Ecological Effects

1. Might the project significantly affect fisheries or wildlife, especially any rare or endangered species?
Yes ____ No __x__

Explanation and Source:

No fish or wildlife are located on or in the vicinity of the project area or will be affected by the project.

2. Might the project significantly affect vegetation, especially any rare or endangered species of plant?
Yes ______ No __X__
(Estimate approximate number of mature trees to be removed: __________)

Explanation and Source:

No vegetation of any kind is located on or in the vicinity of the project area or will be affected by the project.

3. Might the project alter or affect flood hazard areas, inland or coastal wetlands (e.g., estuaries, marshes, sand dunes and beaches, ponds, streams, rivers, fish runs, or shellfish beds)? Yes ______ No __X__

Explanation and Source:

The project area is not located in a flood hazard area and no inland or coastal wetlands are located on the project area or will be affected by the project.

4. Might the project affect shoreline erosion or accretion at the project site, downstream or in nearby coastal areas? Yes ______ No __X__

Explanation and Source:

See #3 above.

5. Might the project involve other geologically unstable areas? Yes ______ No __X__

Explanation and Source:

No geologically unstable area is located on or in the vicinity of the project area, according to present information.

D. Hazardous Substances

1. Might the project involve the use, transportation, storage, release, or disposal of potentially hazardous substances?
Yes ______ No __X__

Explanation and Source:

The project will not involve the use, transporation, storage, release or disposal of potentially hazardous substances.

E. Resource Conservation and Use

1. Might the project affect or eliminate land suitable for agricultural or forestry production?
   Yes ______ No __x__
   (Describe any present agricultural land use and farm units affected.)

   Explanation and Source:

   The project area is presently being used as a surface parking lot. No present agricultural land use and farm units will be affected by the project. The surrounding land use is a mix of retail, office, parking and public facilities typical of the downtown core area. The project area is unsuitable for agricultural or forestry production.

2. Might the project directly affect the potential use or extraction of mineral or energy resources (e.g., oil, coal, sand & gravel, ores)? Yes ______ No __x__

   Explanation and Source:

   There is no evidence of mineral or energy resources in the project area.

3. Might the operation of the project result in any increased consumption of energy? Yes __x__ No ______

   Explanation and Source:
   (If applicable, describe plans for conserving energy resources.)

   The energy consumption of the project once it is completed and in full operation will be approximately as follows:

   1. Residential space - 100,000 BTU/square foot/year
   2. Office space - 60,000 BTU/square foot/year
   3. Retail Space - 175,000 BTU/square foot/year
   4. Health club - 200,000 BTU/square foot/year

F. Water Quality and Quantity

1. Might the project result in significant changes in drainage patterns? Yes __x__ No ______

   Explanation and Source:

   Storm runoff from the project will be routed through a closed system directly into the municipal drainage system and ultimately into Boston Harbor. A connection permit will be required from the City of Boston. Runoff will be slightly less then the existing runoff (presently 100%) because of the absorbtion of the landscaped areas. No adverse effect on water quality due to runoff is anticipated.

2. Might the project result in the introduction of pollutants into any of the following:
   (a) Marine Waters .... Yes ______ No __x__
   (b) Surface Fresh Water Body .... Yes ______ No __x__
   (c) Ground Water .... Yes ______ No __x__

   Explain types and quantities of pollutants.

   The project will discharge an estimated 125,[illegible] gallons of sanitary waste per day into the municipal sanitary sewerage system, which waste will ultimately go to the Deer Island Sewerage Treatment Plant. A connection permit will be required from the City of Boston. The capacity of the plant is sufficient to bear this waste. Waste discharge from the project will primarily be from toilets. No industrial waste or other contaminants will be produced by the project. Sanitary sewage will not significantly affect water quality.

3. Will the project generate sanitary sewage? Yes X No ___

If Yes, Quantity: 125,000 gallons per day

Disposal by: (a) Onsite septic systems .... Yes ___ No X

(b) Public sewerage systems .... Yes X No ___

(c) Other means (describe) ___

See #2 above

4. Might the project result in an increase in paved or impervious surface over an aquifer recognized as an important present or future source of water supply? Yes ___ No X

Explanation and Source:

No aquifer exists on or in the vicinity of the site.

5. Is the project in the watershed of any surface water body used as a drinking water supply?
Yes ___ No X

Are there any public or private drinking water wells within a 1/2-mile radius of the proposed project?
Yes ___ No X

Explanation and Source:

6. Might the operation of the project result in any increased consumption of water? Yes X No ___

Approximate consumption 130,000 gallons per day. Likely water source(s) MDC Quabbin Reservoir

Explanation and Source:

7. Does the project involve any dredging? Yes ___ No X

If Yes, indicate:

Quantity of material to be dredged ___
Quality of material to be dredged ___
Proposed method of dredging ___
Proposed disposal sites ___
Proposed season of year for dredging ___

Explanation and Source:

G. Air Quality

1. Might the project affect the air quality in the project area or the immediately adjacent area?
Yes __X__ No ______

Describe type and source of any pollution emission from the project site.

The HVAC systems of the project may generate emissions. However, emissions from automobile exhausts may decrease despite the increased number of parking spaces because the underground garage will contain a ventilation/filtration system not present in the existing surface parking facility. Information as to vehicle trips is not currently available.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any pollution emissions caused by the project, including construction dust? Yes ______ No __X__

Explanation and Source:

There are no known sensitive receptors on or near the site which would be affected by pollution emissions caused by the project.

3. Will access to the project area be primarily by automobile? Yes ______ No __X__

Describe any special provisions now planned for pedestrian access, carpooling, buses and other mass transit.

Access will be primarily by foot and public transportation. A pedestrian walkway through the building between Washington and Devonshire Streets is included in the project. The project area is one of dense pedestrian use. There are MBTA Orange Line and Blue Line stops within 1/2 block of the project area.

H. Noise

1. Might the project result in the generation of noise? Yes __X__ No ______

Explanation and Source:
(Include any source of noise during construction or operation, e.g., engine exhaust, pile driving, traffic.)

Once completed the project will result in a decrease in noise by the elimination of the surface parking facility. Construction noise typical of a project of this type may be anticipated, but, based on present information, no pile driving will be necessitated since the project will utilize a concrete mat foundation. Increased traffic to the project area may result in some increased noise, though, given the current noise level in the area, this should not be significant.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any noise caused by the project? Yes ______ No __X__

Explanation and Source:

There are no known sensitive receptors on or near the site which would be affected by noise caused by the project.

I. Solid Waste

1. Might the project generate solid waste? Yes __X__ No _____

Explanation and Source:
(Estimate types and approximate amounts of waste materials generated, e.g., industrial, domestic, hospital, sewage sludge, construction debris from demolished structures.)

During construction, solid waste will be generated by excavation of the project area for the underground parking, which waste will be periodically hauled away from the site to appropriate landfill areas. The completed project will generate approximately 2 tons of solid waste per day which will be collected and disposed of by a private contractor.

J. Aesthetics

1. Might the project cause a change in the visual character of the project area or its environs?
Yes __X__ No _____

Explanation and Source:

The project will eliminate a ground level parking lot that is widely acknowledged to be a community eyesore. The project is designed in such a way as to visually maintain the existing building lines. The ground level plaza and landscaping will visually enhance the project area and its environs. The project is being designed in connection with the BRA design review process.

2. Are there any proposed structures which might be considered incompatible with existing adjacent structures in the vicinity in terms of size, physical proportion and scale, or significant differences in land use?
Yes _____ No __X__

Explanation and Source:

The project will fit in well with existing adjacent structures in terms of size, physical proportion and scale in that height lines will be visually intact (via the seventh floor setback), and in that neighboring high-rise buildings at 60 State Street, 28 State Street, and 1 Boston Place are significantly higher than the project. Office and retail uses are consistent with adjacent land use. Residential use is a new, but positive land use in the area.

3. Might the project impair visual access to waterfront or other scenic areas? Yes _____ No __X__

Explanation and Source:

There is presently no visual access to waterfront or other scenic areas from the project area.

K. Wind and Shadow

1. Might the project cause wind and shadow impacts on adjacent properties? Yes __X__ No _____

Explanation and Source:

Because of the height and location of existing mid-rise and high-rise buildings in the area, it is anticipated that wind and shadow impacts will be minimal. Further wind and shadow studies are planned.

IV. CONSISTENCY WITH PRESENT PLANNING

A. Describe any known conflicts or inconsistencies with current federal, state and local land use, transportation, open space, recreation and environmental plans and policies. Consult with local or regional planning authorities where appropriate.

There are no known conflicts or inconsistencies with current federal, state and local land use, transportation, open space, recreational and environmental plans and policies. It is anticipated that certain variances from dimensional requirements and a parking permit may be required. The project is being designed in connection with and in cooperation with the BRA design review process.

V. FINDINGS AND CERTIFICATION

A. The notice of intent to file this form has been/will be published in the following newspaper(s) :

(Name) Boston Globe (Date) March 14, 1979

B. This form has been circulated to all agencies and persons as required by Appendix B.

March 15, 1979
Date

Harvey E. Rothenberg
Signature of Responsible Officer or Project Proponent

Harvey E. Rothenberg
Name (print or type)

Address c/o Lawrence Ruben Company
630 Third Avenue
New York, NY 10017

Telephone Number (212) 986-8194

March 15, 1979
Date

Marc Cumsky
Signature of person preparing ENF (if different from above)

Marc D. Cumsky, Esq.
Name (print or type)

Address Fine & Ambrogne
133 Federal Street
Boston, MA 02110

Telephone Number (617) 482-0100

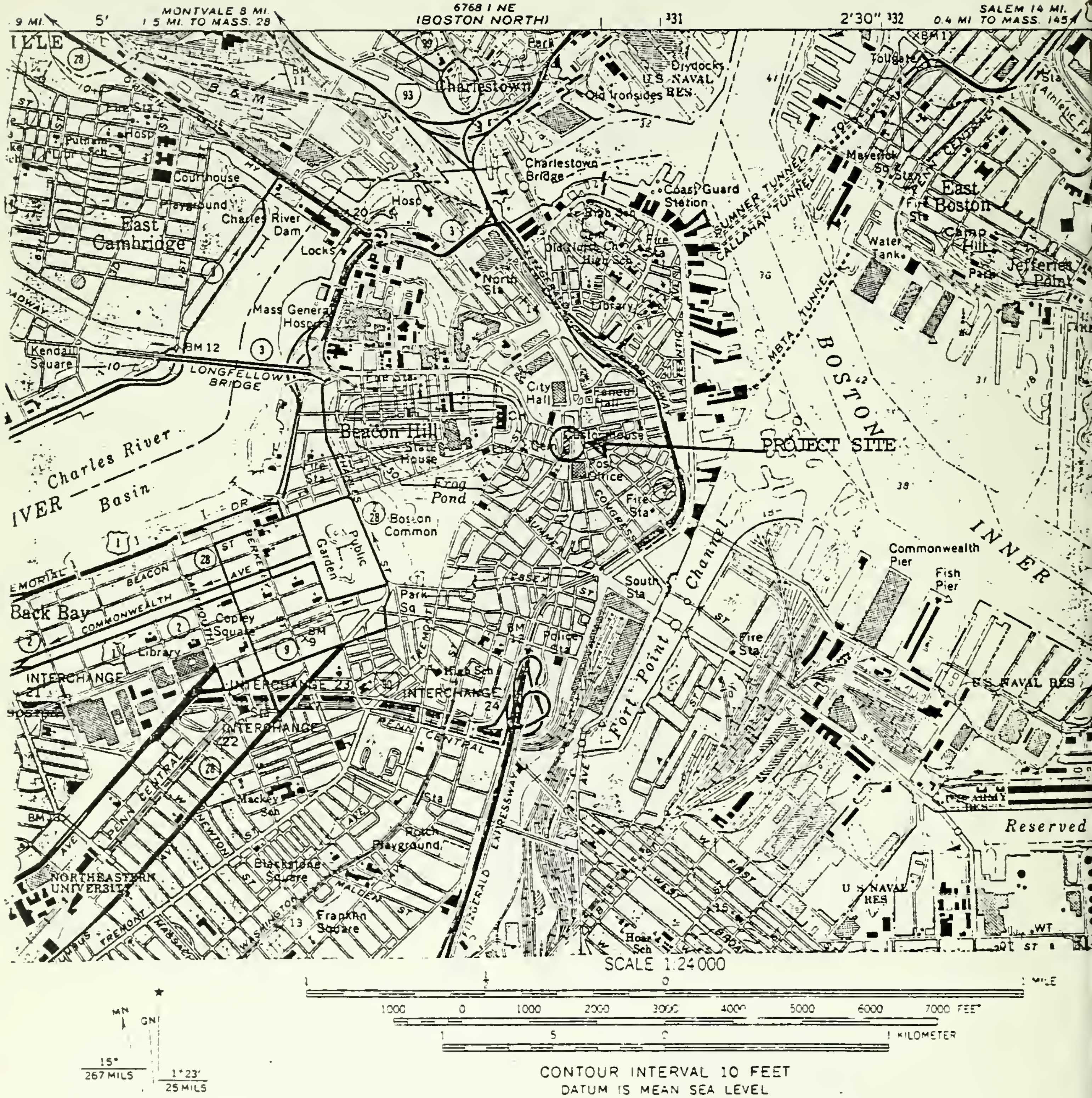
The Boston Globe Wednesday, March 14, 1979

LEGAL NOTICES

NOTICE OF INTENT TO SUBMIT ENVIRONMENTAL NOTIFICATION FORM— Devonshire Associates hereby gives notice that on or about March 15, 1979 an Environmental Notification Form (ENF) will be submitted to the Secretary of Environmental Affairs under the provisions of MEPA, M.G.L. Ch. 30, SS62-H, inclusive for the construction of a forty story commercial and residential building at 250 Washington Street, Boston, Massachusetts. Copies of this ENF will be available from Marc D. Cumsky, Esq., Fine & Ambrogne, 133 Federal Street, Boston, MA 02110. This ENF will be available for public inspection during business hours at the MEPA Unit, Executive Office of Environmental Affairs, 100 Cambridge Street, 20th Floor, Boston, Massachusetts 02202, and also at Boston Conservation Commission located at One City Hall Square, Boston, MA 02201. Public Notice of the filing of the ENF will be published by the Secretary of Environmental Affairs in the Environmental Monitor. A twenty day period for submission of public comments will follow the publication of notice in the Monitor. Please write or call the MEPA Unit at 727-5830 for information on public comment periods and how to subscribe to the Monitor. By: Devonshire Associates.

EXHIBIT A

General Location Map - Source - USGS



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 9.5 FEET

UTM GRID AND 1970 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

EXHIBIT B
SITE LOCATION MAP
SOURCE: BRA

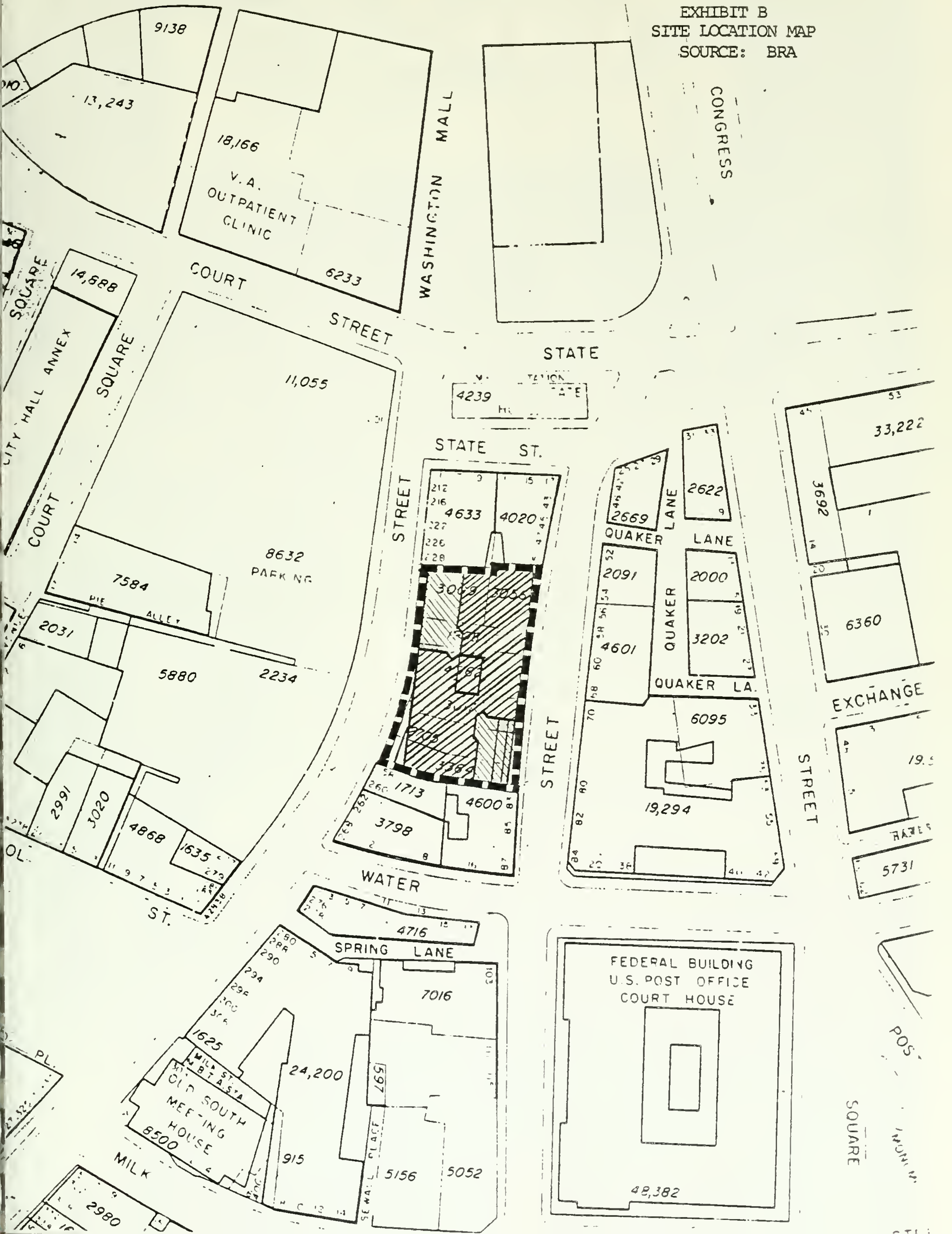


EXHIBIT C
SITE LOCATION MAP
SOURCE: BRA

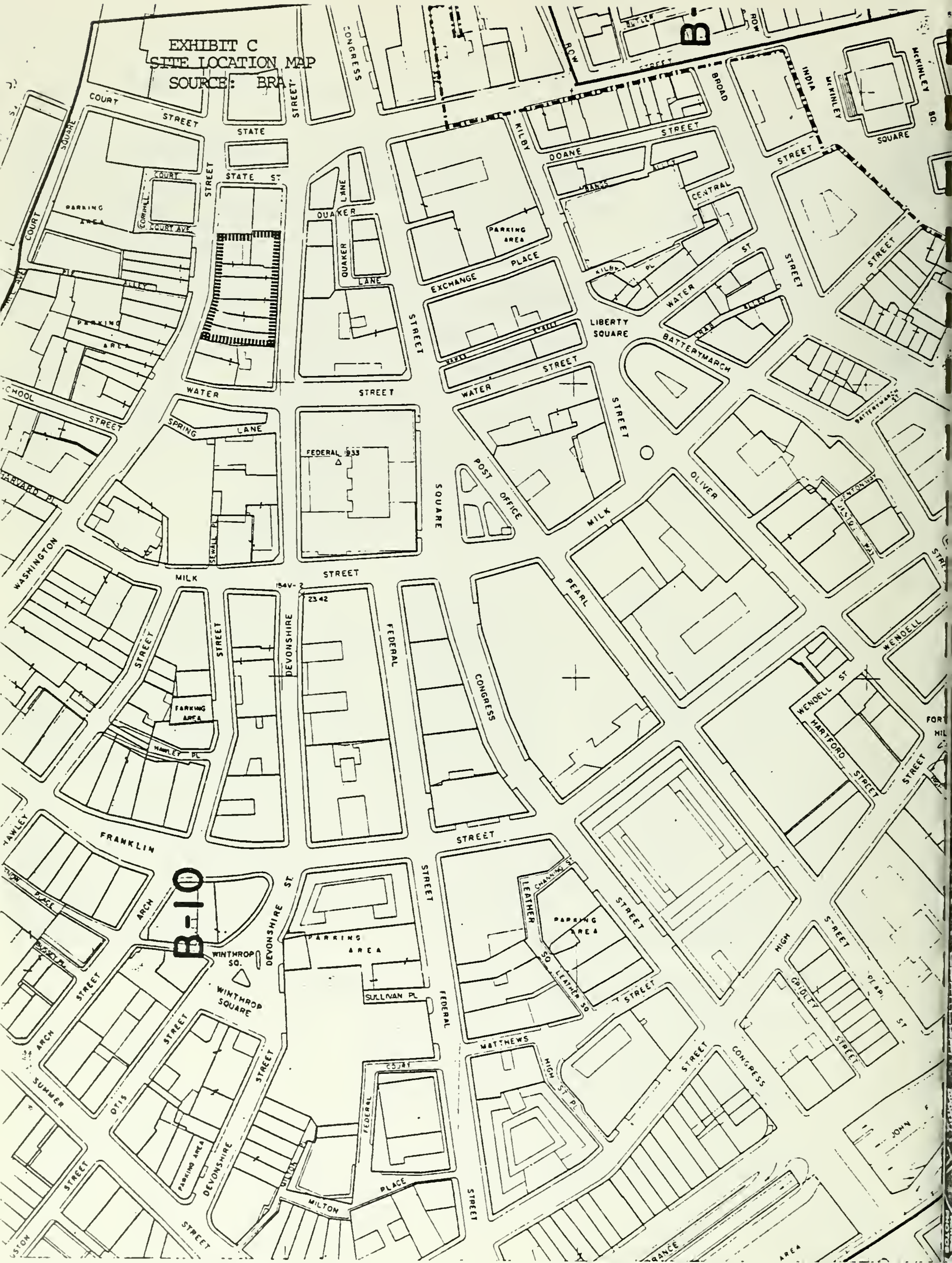


EXHIBIT D

EXISTING NEIGHBORHOOD LAND USE

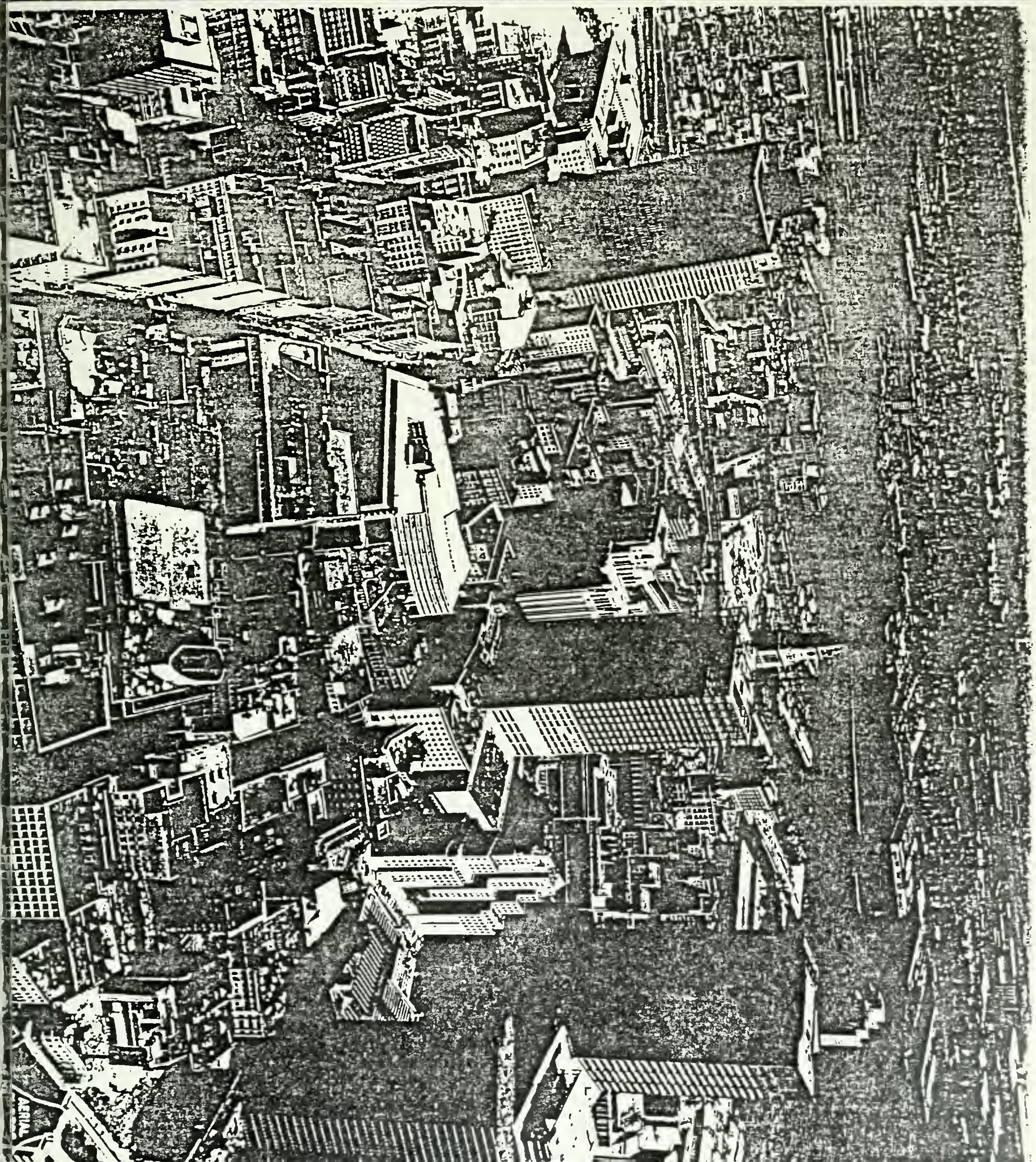
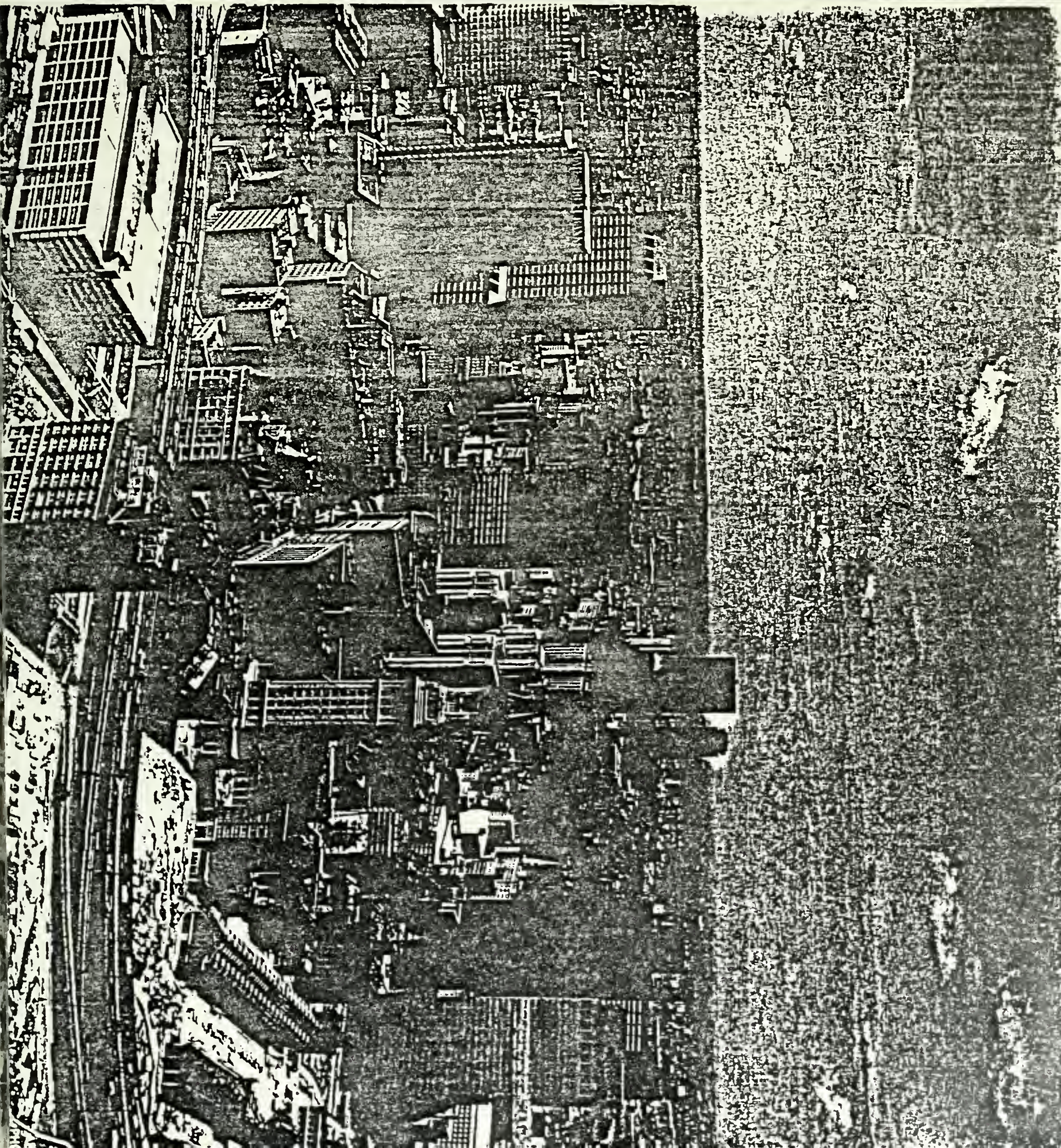


EXHIBIT E

EXISTING NEIGHBORHOOD LAND USE

EXHIBIT F

EXISTING NEIGHBORHOOD LAND USE



2. SUMMARY SHEET

2.1 Name of the Project/Brief Description

The name of the project addressed in this Draft Environmental Impact Report is Devonshire Towers. The project will involve the development of a high-rise, multi-use tower between Washington and Devonshire Streets in the Central Business District of Boston. The building is comprised primarily of parking, retail space, office space, apartments and a health club.

2.2 State Identification Number

The EOEA file number for the project is #03408.

2.3 Name of the Proponent

The developer for the project is Devonshire Associates. The principals of the firm are experienced in the development of urban multi-use buildings.

2.4 Status of the Environmental Impact Report

This is the Draft EIR submitted pursuant to Massachusetts Policy Act and the EOEA regulations governing the implementation of the act. The Draft EIR has been prepared as a result of a Certificate of the Secretary of Environmental Affairs determining that the project requires an EIR. The content of the report has been designed to comply with the determination of scope and alternatives issued by the Secretary on April 20, 1979.

2.5 Jurisdictions Affected (City and County)

The Devonshire Towers site lies within the Central Business District (CBD) of Boston, which is in Suffolk County. Potential for impact is localized within an area of several blocks surrounding the development parcel.

2.6 Summary of Major Impacts

The Devonshire Towers building will cause additional shadows in the immediate area of the site. The increased shadows will take place on the pedestrian plaza of One Boston Place, and on Washington Street, during the noon hour during spring, summer, and fall seasons. Some additional shadows will be felt on the Washington Mall, as well, during early spring and late fall. These shadows will be perceived as impacts by the pedestrians in the area.

The site is located in an area subject to high winds. Wind problems have been observed at other nearby high-rise locations. Further wind studies will be undertaken by Devonshire Assocaites prior to construction. These studies are needed to ensure that pedestrian level wind problems are not created. The wind tunnel modeling will also ensure that balcony and rooftop areas of the building are not subject to excessive winds, and that the building's location in the wake of nearby buildings does not cause unusual or unexpected structural problems.

Potential for impacts in other areas appears quite limited. For the most part, other impacts are related to the construction phase of the project. The inconvenience of construction is an unavoidable short-term impact. Subsequent to construction, Devonshire Towers will be a substantial improvement to the visual quality of the immediate area. Replacement of the existing parking lot by the attractive new building and its ancillary amenities should be seen as a benefit by abuttors and visitors to the area alike. The project also appears to be consistent with City plans to renovate blighted areas in the Washington Street corridor.

3. DESCRIPTION OF THE PROJECT

3.1 Type of Project

The Devonshire Towers project will be a high-rise multi-use building. The site is in the Central Business District (CBD) of Boston. It is surrounded largely by ten- to fifteen-story commercial buildings with retail space at the street level. The project will involve the redevelopment of an existing surface parking lot. Figure 3.1.1 shows the five main building uses; parking, retail, offices, residential apartments, and a health club.

The parking garage will occupy the three levels below grade. It will be serviced by its own elevator. The 150-car parking garage will represent a significant increase in parking space over the 75-car capacity of the surface lot. The garage will be used mainly by office and apartment tenants. Turnover rates and fee structures have not yet been determined.

Above the garage, along the Washington and Devonshire Street level, there will be retail space. A pedestrian passageway between the two streets is also incorporated into this level. Likewise, the ground level includes lobbies with access to the upper levels above via elevators.

Levels 2 through 6 consist of office space. Access to these office floors is on the Washington Street side of the building near the center of the site. These floors will be accessed through a separate elevator lobby also.

Above the office floors will be 32 floors of market rate apartments. Five percent of these will be tailored for use by handicapped persons. Access to the separate residential elevator lobby will be on the pedestrian passageway. There will be a laundry area and sun deck on the seventh floor for use by residents. Building management will also be on level seven.

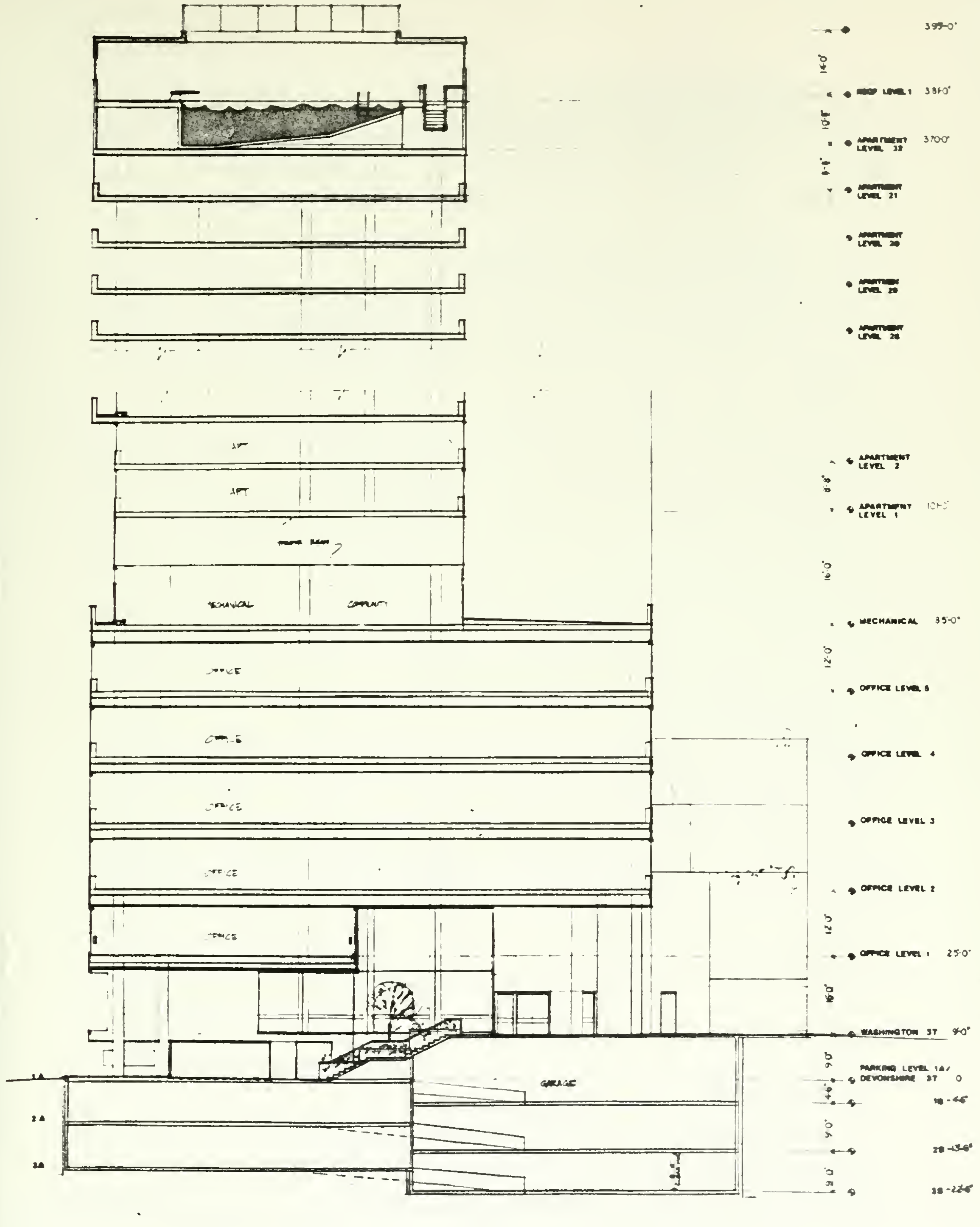


FIGURE 3.1.1 CROSS SECTION OF BUILDING

The top level of the building will house a health club. This facility will include saunas, exercise rooms, a swimming pool, a sundeck, a function room, lounge and bar. It will be used primarily by building tenants.

3.2 Objectives of the Project

The primary objective of the Devonshire Towers project is to introduce the concept of multi-use CBD development to Boston. The concept, which is becoming widely accepted in other major cities, has yet to be implemented in Boston. The heart of the multi-use CBD concept is the design of a human environment which fosters round-the-clock activities. This is done by providing housing, commercial activities and service facilities together in a single development at one urban site. The multi-use concept is most successful where the elements of the development are designed to complement each other. At the same time, the multi-use facility must be sensitive to the human activities and scales of surrounding properties. In many ways, the concept is the urban version of the Planned Unit Development (PUD) more common in the suburban areas of the country.

Provision of the attractive, new, market rate housing is intended to draw middle class residents back to the urban core. The attraction of the middle class is beneficial to the city in several ways. The middle class brings with it the economic incentive of increased local spending, cultural interests and social and political diversification. The middle class, when brought back into the city as residents, and not just as commuters, will be more directly concerned with the quality of life in the city, and more likely to work to help improve it.

The portion of the population attracted to the multi-use CBD development has its own objective of maintaining a dwelling unit which increases the efficiency of daily life. Among the efficiencies expected are:

- proximity to work place (either the commercial portion of the development or other activities within walking distance);
- proximity to the many varied cultural resources in the urban core;
- reduced dependence on the automobile and increased leisure time as daily commuting is eliminated; and
- increased efficiency of services.

Key objectives of the City appear to be achieved by the development of Devonshire Towers as well. City revenues, for example, will be increased considerably by the development. The existing parking lot will be replaced by a $30 million structure, greatly increasing the tax base. Since the development will use existing roadways and infrastructure, the increased tax base will be provided at little or no cost to the City.

The project also provides housing where there is currently none. The provision of this new multi-use CBD housing appears consistent with Boston's attempts to revitalize the core area. The development will compliment redevelopment evident in the string of other City-sponsored projects along the axis of Washington Street including the Quincy Market, Washington Mall, Lafayette Place, and the renovation of the theatre district.

3.3 General Characteristics

Dimensions

Devonshire Towers will occupy the entire 21,323 square feet of the lot on which the site lies. The building will be forty stories above grade at Washington Street. This will be 375 feet from the street to the parapet. The material of the building will be a flush, rear-fastened panel of either metal or porcelain enamel.

Figure 3.1.1 shows a cross-section of the building and its five main uses: parking, retail, office, residential, and health club. Figures 3.3.1 and 3.3.2 show views of the building from Washington Street and Devonshire Street, respectively. Beginning at the sixth level above grade on Washington Street, the building is set back from the street. This serves to remove the residential levels from the street.

The total floor area of the building will be approximately 574,000 square feet. Three levels will be garage space. A typical garage level is shown in Figure 3.3.3. Figure 3.3.4 and 3.3.5 show the approximately 9,500 square feet that will be allotted to retail space on the ground levels. 82,500 of it will be the commercial office space on Levels 2 through 6. A typical office level is shown on Figure 3.3.6. The remaining space will include the mechanical and managerial area on Level 7 (see Figure 3.3.7), 32 floors of apartments containing 478 units, and the top floor health club. The typical apartment floor is shown in Figure 3.3.8. The top floor and roof deck are shown in Figures 3.3.9 and 3.3.10, respectively.

Water and Sanitary Waste

During operation, the building will use approximately 130,000 gallons of water per day. The source of the water will be the MDC Quabbin reservoir. The building will generate approximately 125,000 gallons of sanitary waste per day. This will be discharged into the municipal sanitary sewage system. The waste will ultimately go to the Deer Island Sewage Treatment Plant. A connection permit will be required. The main source of the waste discharge will be toilets. No industrial waste or other contaminants will be produced by the project.

Heating

The building will be heated by natural gas. The system will be hot water flowing through a fan coil. The heat load will be 8,500,000 Btu per hour. The heating system will be insulated with fiberglass. Rooms will be heated by vertical fan coil units, each with an individual thermostat.

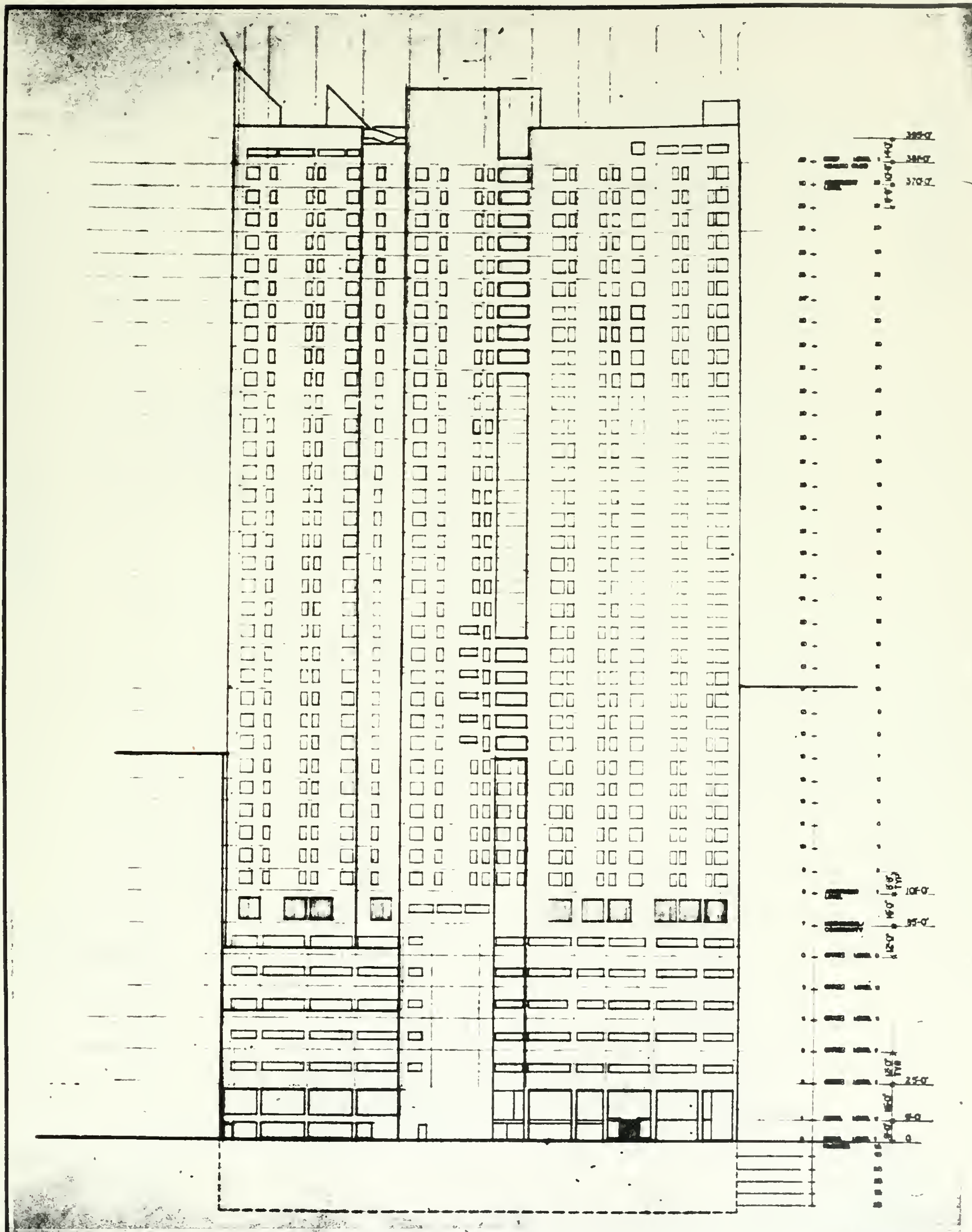


FIGURE 3.3.1 VIEW OF BUILDING FROM WASHINGTON STREET

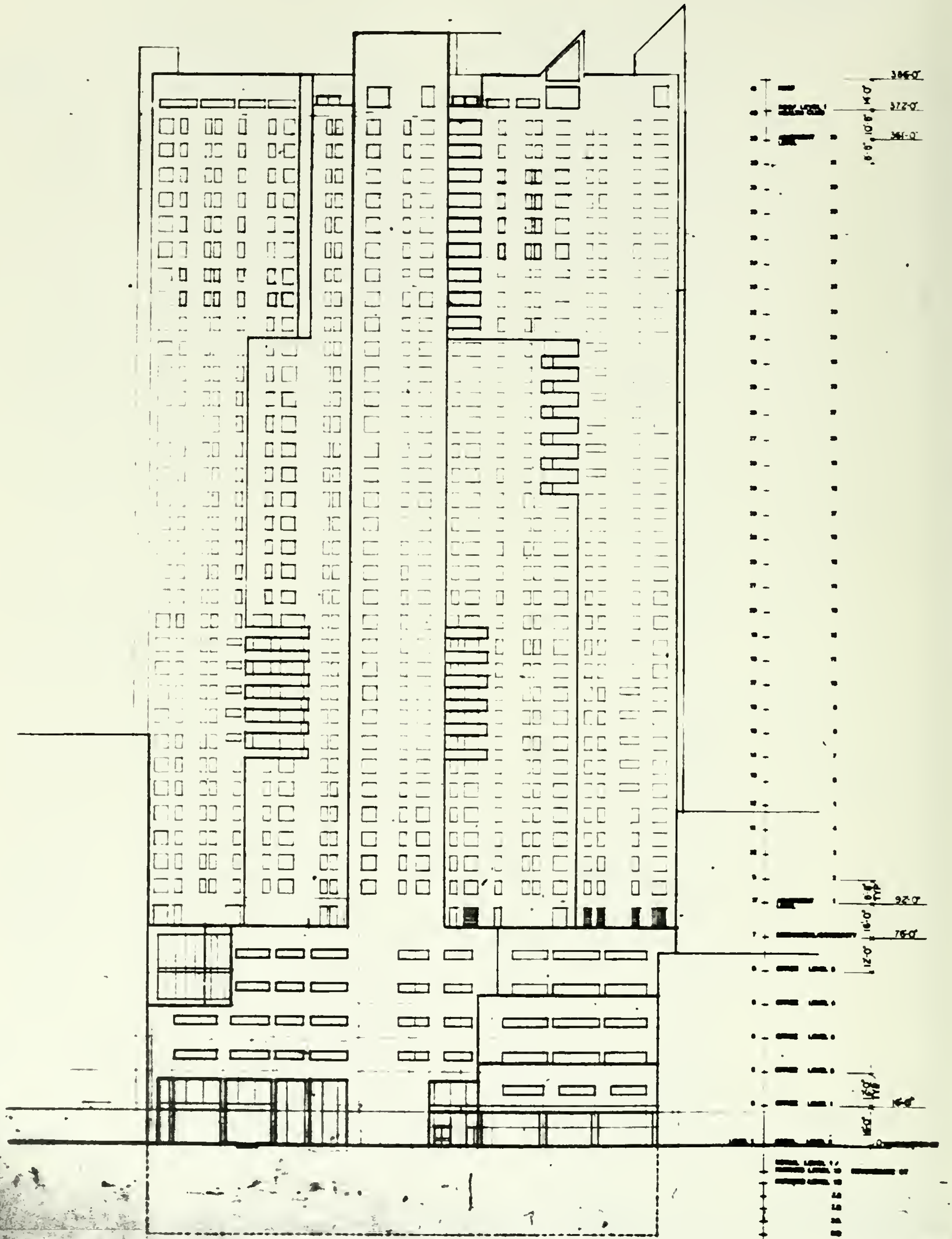


FIGURE 3.3.2 VIEW OF BUILDING FROM DEVONSHIRE STREET

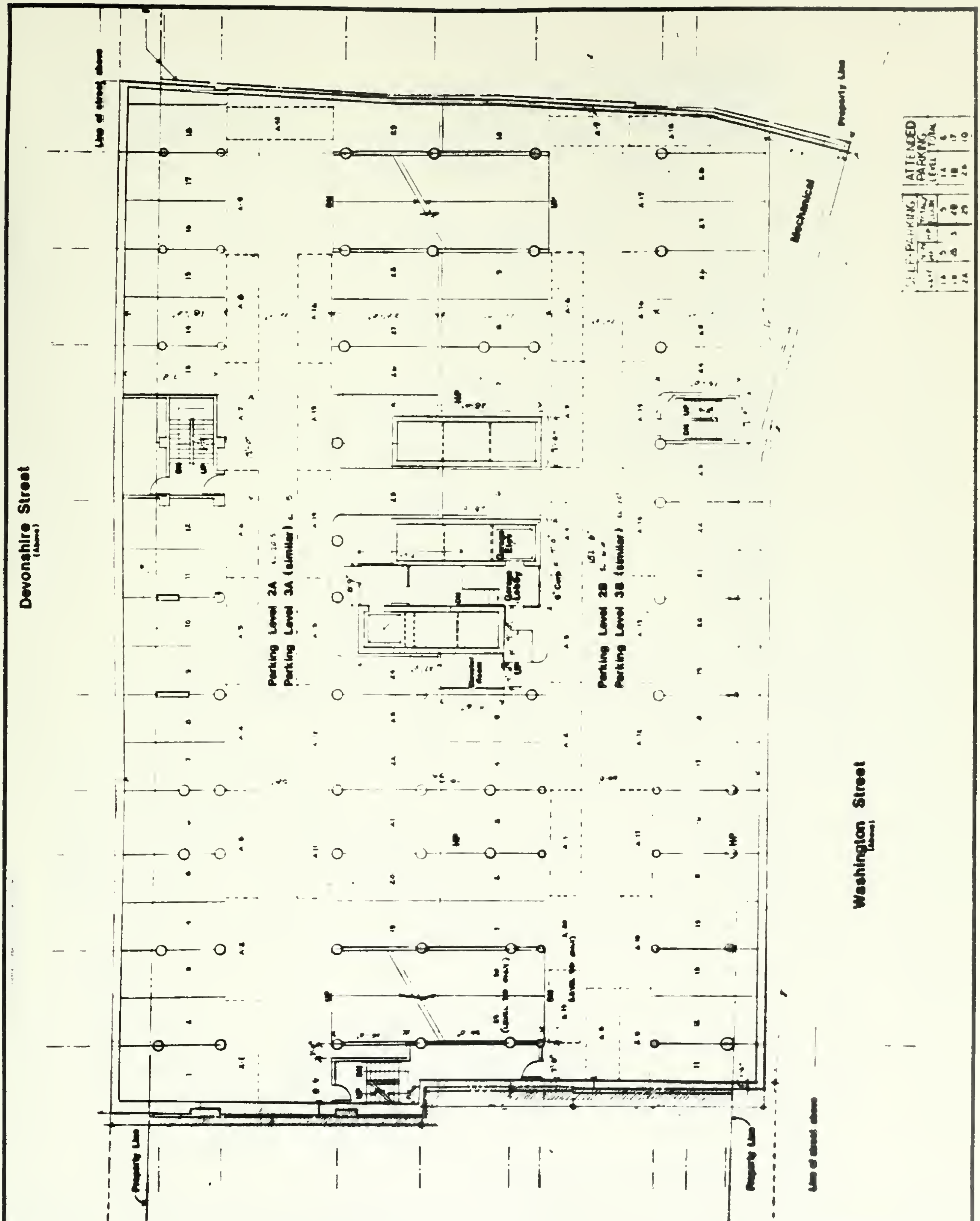


FIGURE 3.3.3 FLOOR PLAN OF TYPICAL GARAGE LEVEL

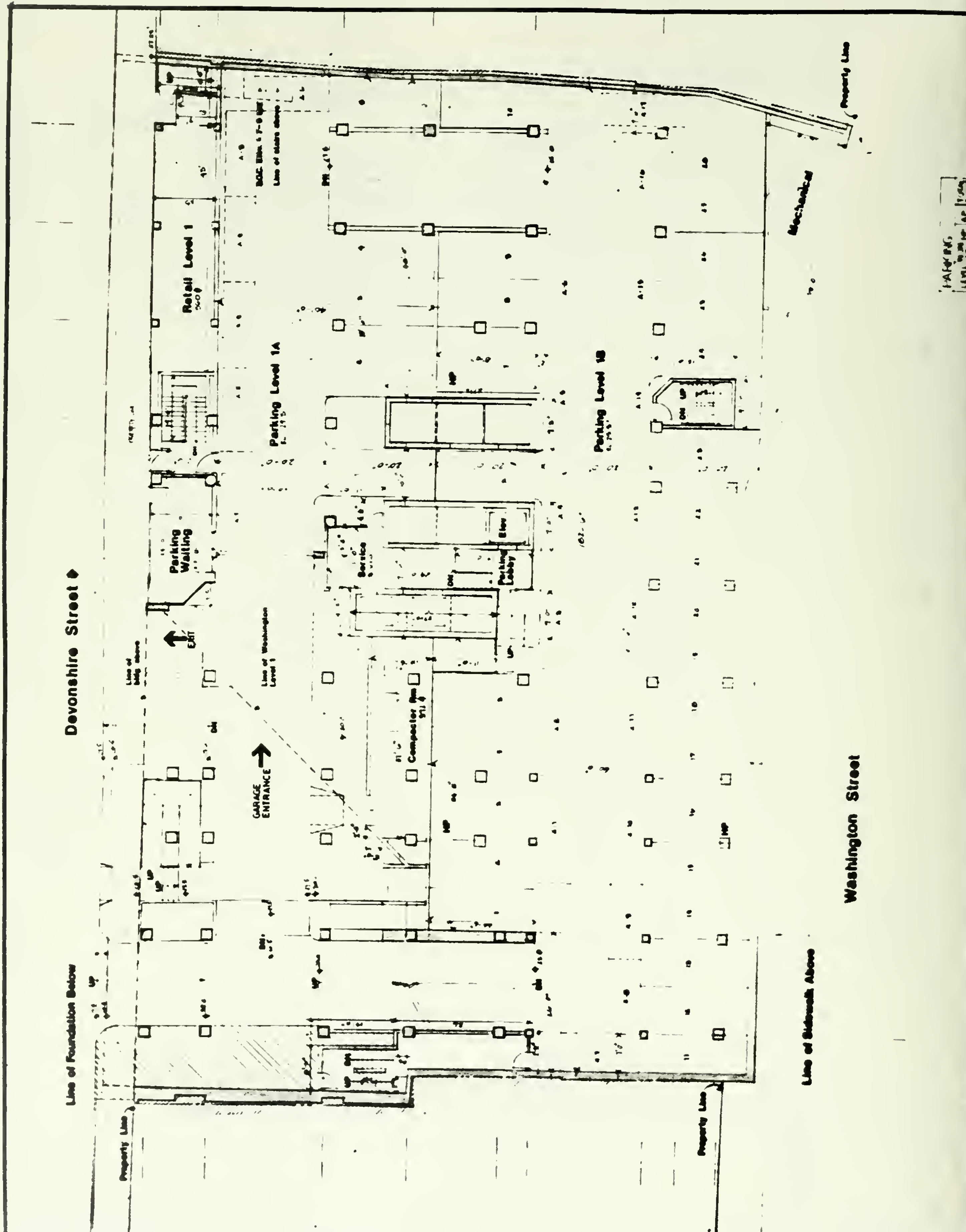


FIGURE 3.3.4 FLOOR PLAN OF DEVONSHIRE STREET LEVEL

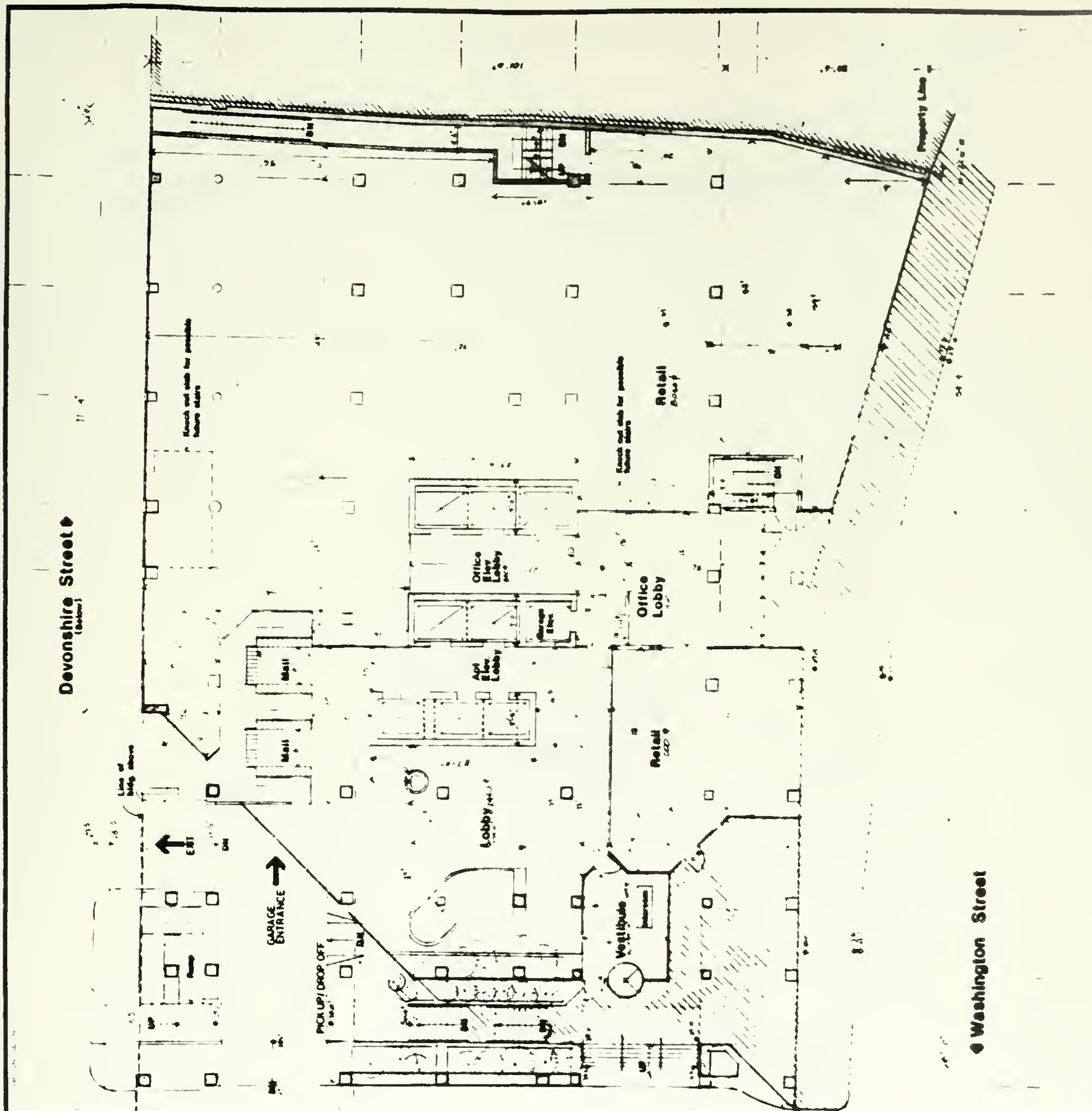


FIGURE 3.3.5 FLOOR PLAN OF WASHINGTON STREET LEVEL

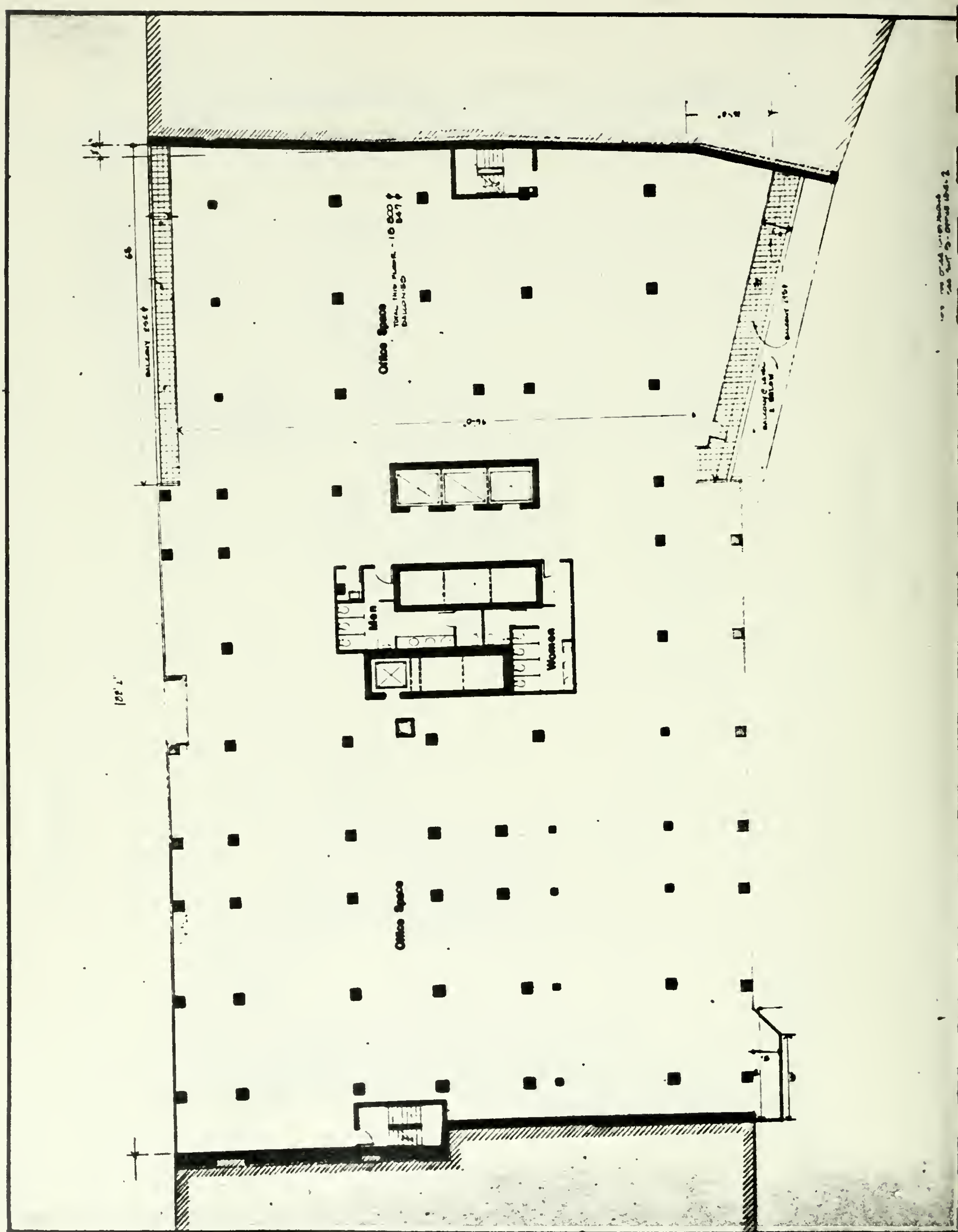


FIGURE 3.3.6 FLOOR PLAN OF TYPICAL OFFICE LEVEL

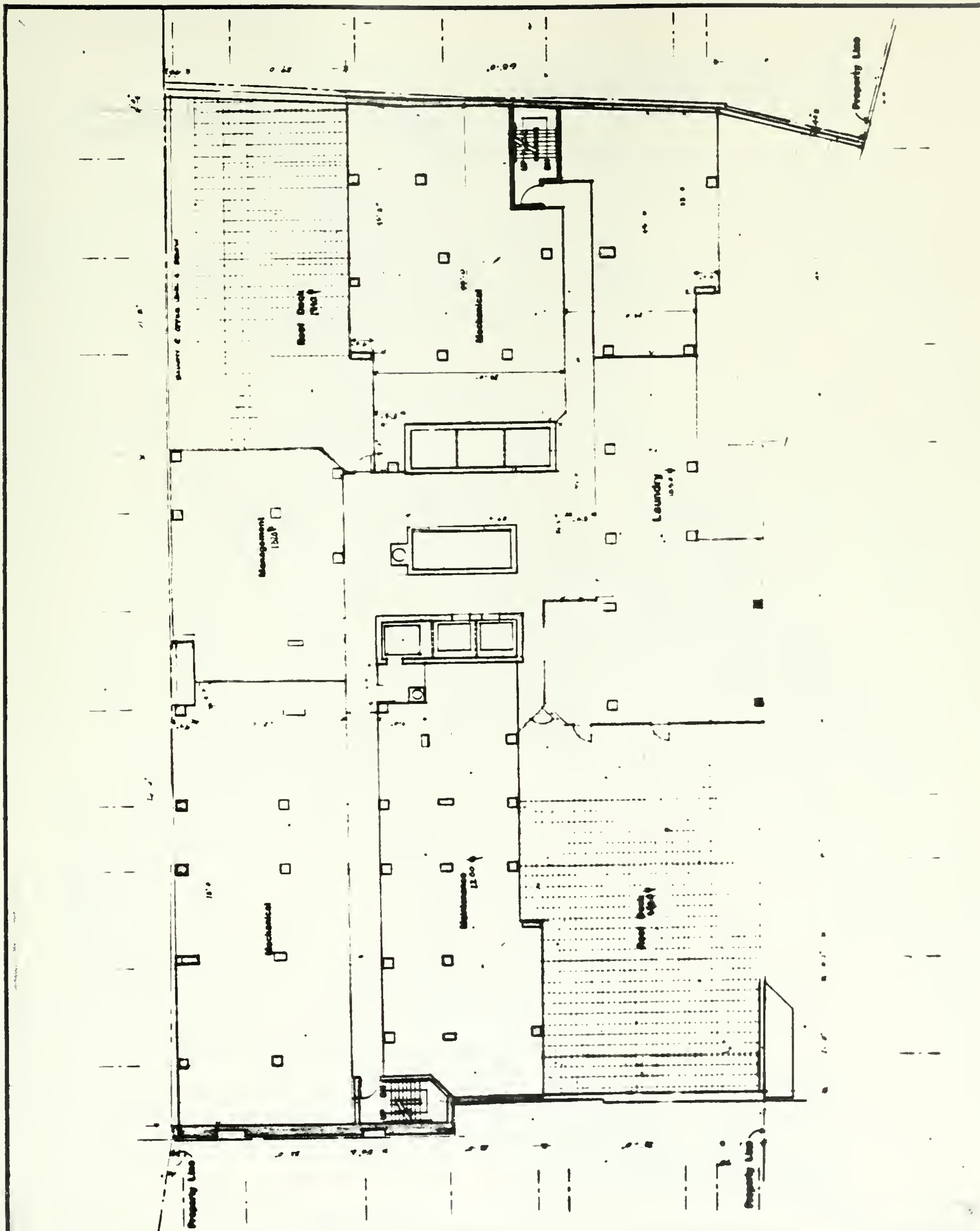


FIGURE 3.3.7 FLOOR PLAN OF LEVEL 7

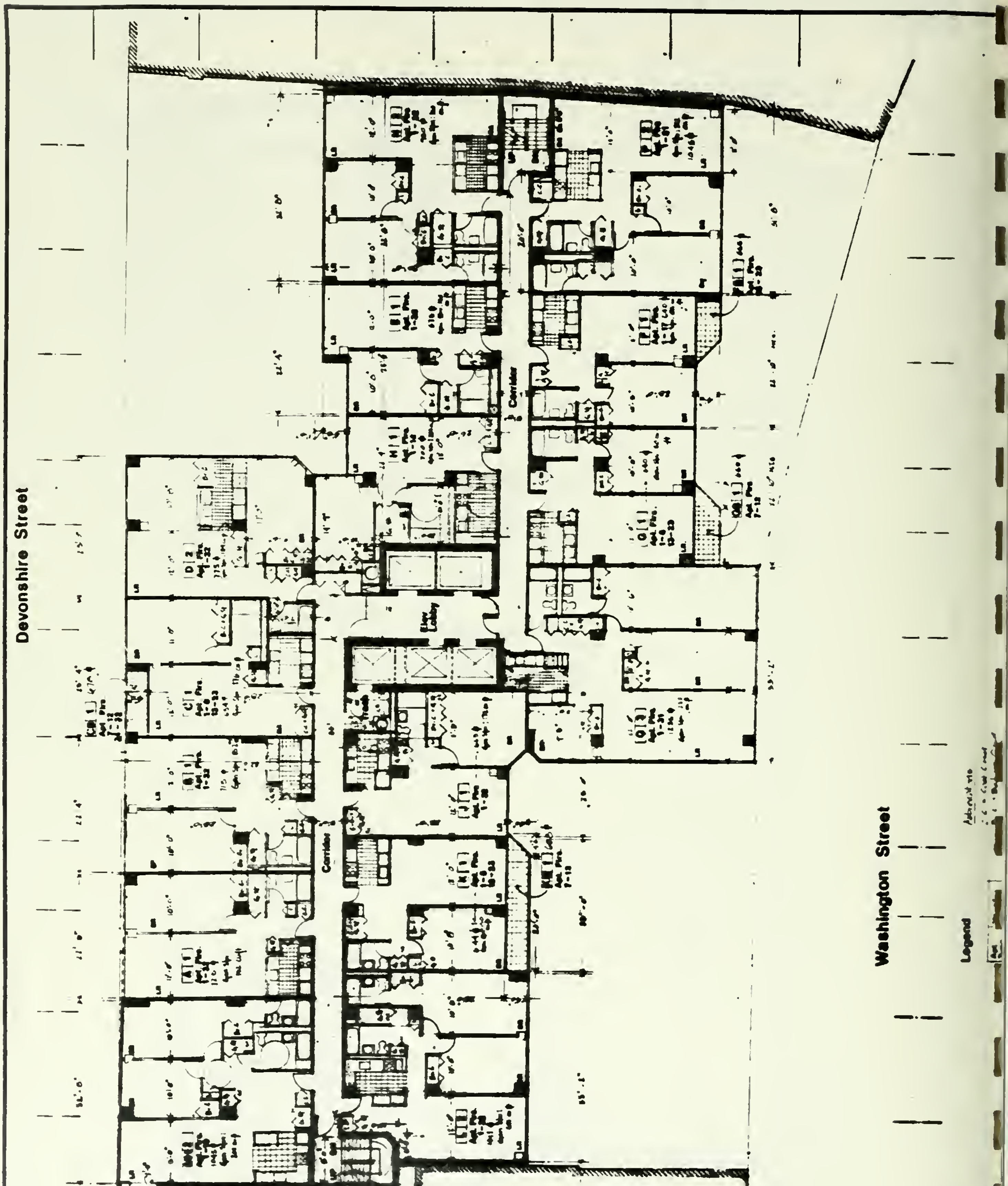


FIGURE 3.3.8 FLOOR PLAN OF TYPICAL APARTMENT LEVEL

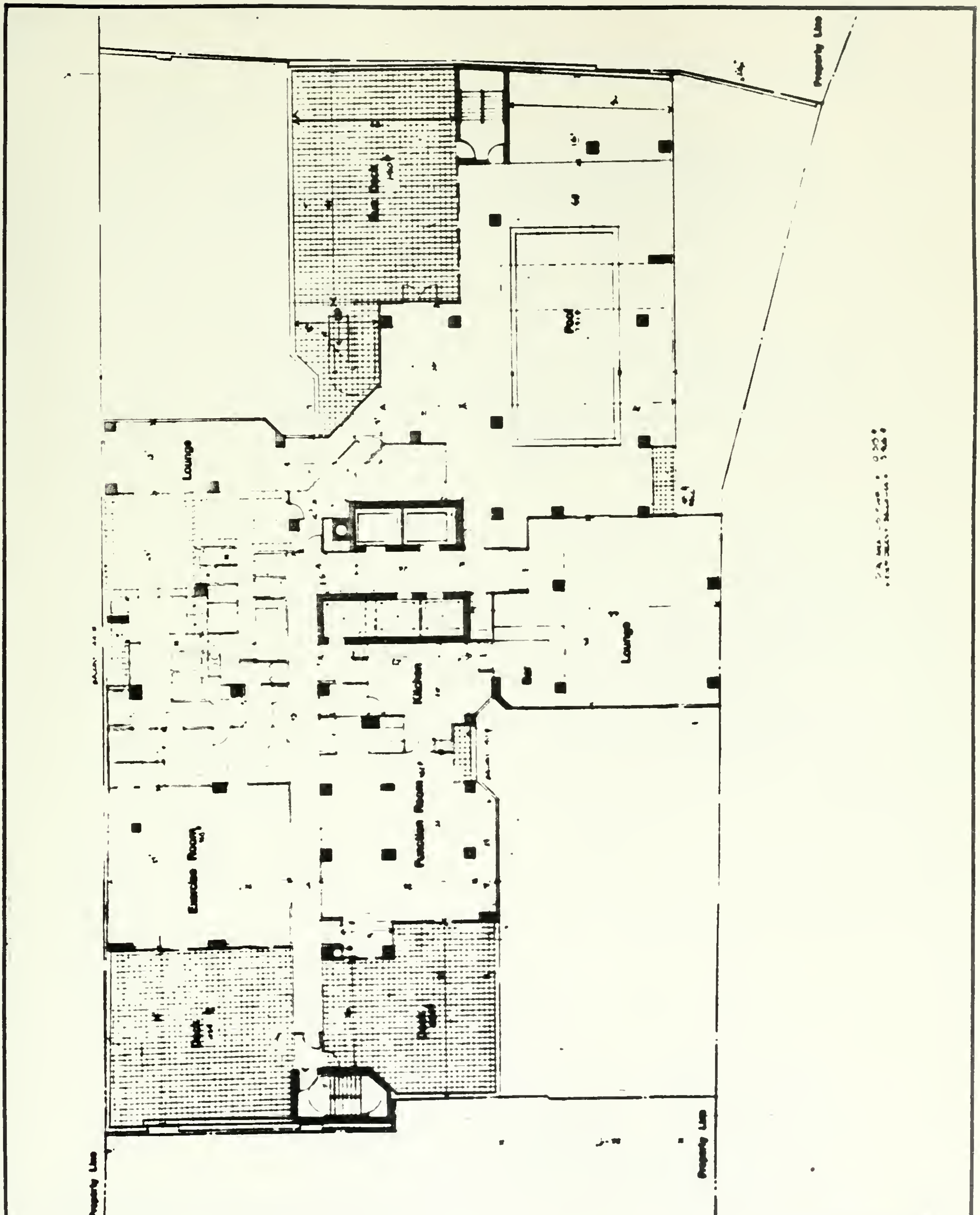


FIGURE 3.3.9 FLOOR PLAN OF TOP FLOOR

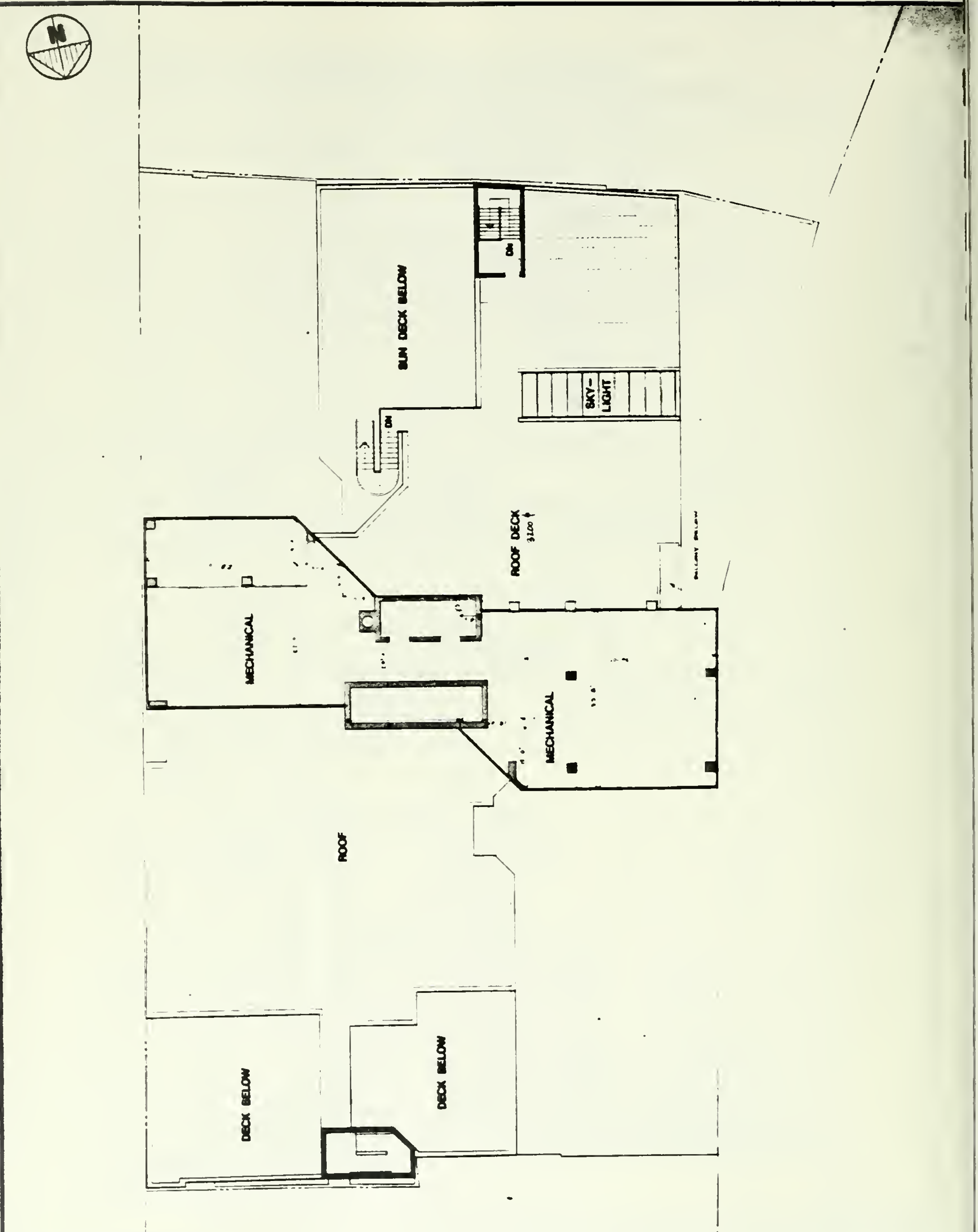


FIGURE 3.3.10 FLOOR PLAN OF ROOF

Exhaust

There will be toilet and kitchen exhaust fans on the ceilings. Corridors will have smoke exhaust systems. The garage, utility, mechanical, laundry, and trash rooms will also have exhaust systems.

Air Conditioning

The calculated load for the central air conditioning is 855 tons. The air-conditioning system will be chilled water through a vertical fan coil cooling tower for apartments and air-handling equipment for the offices.

Electrical

Devonshire Towers will use EMT and THW conductors as feeders. There will be an individual metering system throughout the building. A television antenna system will be built into the building. Lightening protection will also be included.

Kitchens, corridors and stairs will have fluorescent lighting. The remaining lighting will be incandescent.

Solid Waste

Devonshire Towers will contain a trash chute and compactor. When operational, the building will generate approximately two tons of solid waste per day. This will be collected and disposed of by a private contractor.

3.4 Construction Phases and Schedules

Construction of Devonshire Towers will take place over the course of twenty-four consecutive months beginning in the fourth quarter of 1979. The construction period can be divided into five overlapping phases of activity, as shown on Table 3.4.1. Phase 1, excavation, will take place during the first four months. Phase 2, placement of foundations,

ANTICIPATED CONSTRUCTION ACTIVITY

	Month of Construction																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Phase 1 - Excavation Workers	5	5	5	5																				
Phase 2 - Foundations Workers		45	45	45	45	45																		
Phase 3 - Superstructure workers						45	45	45	45	45	45	45	45	45	45	45	45	45						
Phase 4 - Enclosure Workers							37	37	37	37	37	37	37	37	37	37	37	37	37	37				
Phase 5 - Finish Work Workers									60	60	80	80	100	100	100	100	100	100	100	100	80	60	40	40
TOTAL Workers on site	5	50	50	50	45	90	82	82	142	142	162	162	182	182	182	182	182	182	137	137	80	60	40	40
Heavy Trucks per Day*	15	16	18	18	18	18	15	15	15	15	15	15	15	15	15	15	15	10	2	2	2	2	2	2

* Assume 1 light truck per hour throughout construction

TABLE 3.4.1

will take place during months two through six, overlapping the excavation phase by about three months. Phase 3, erection of the superstructure, will take place from month six through month eighteen. Enclosing the building, Phase 4, will be accomplished during months seven through twenty, overlapping considerably with Phase 3. Phase 5, the finish work, will take place beginning in month nine, and continuing through project completion in the twenty-fourth month.

Construction will take place five days a week during the twenty-four months. Work will begin at 7:00 A.M. and cease at 4:00 P.M., with activity continuing through 4:30 P.M. on occasion. No overtime, evening, or weekend construction is planned. Throughout the construction period, a management crew will oversee the construction hours and activity.

3.4.1 Excavation

The project will be initiated by the excavation phase. During this phase, a power shovel, a large front-end loader and some miscellaneous smaller pieces of equipment will be required for removing the earth. Over the course of the excavation, as many as 1,200 twenty-yard dump trucks may be required to remove the excavated materials. As many as fifteen trucks per day may be required during peak excavation efforts.

A limited work force of five men is anticipated for the excavation phase. This is the case, since the site is only half an acre. A limited number of earth-moving vehicles and operators is possible in such a small site.

3.4.2 Foundations

The placement of foundations will overlap the excavation phase, beginning in the second month of construction. The foundations will be cast in place, using spread footings and concrete foundation walls. Construction of the foundations will involve forming, sheeting and bracing, laying reinforcing

iron work, pouring the foundation, and waterproofing. During the pouring of the foundation, approximately 250 concrete truck trips will be required. The pouring of the foundation will result in peak activity over a four-day period. During this time, as many as six trucks per hour may ferry the concrete to the site to be pumped into the forms.

Maximum on-site employment during the foundation work will be about 45 persons. The crew will be comprised of carpenters, steelworkers, concrete workers, waterproofers, general laborers, and foremen. The foundations crew will be on-site for approximately five months.

3.4.3 Erection of Superstructure

The superstructure will be of reinforced concrete. Erection of the superstructure will begin in the sixth month of construction. The phase will last approximately thirteen months, ending in month eighteen.

The construction will be accomplished using a tower crane mounted on the superstructure. As the building rises, the crane will be moved upward. Subsequent enclosure and finish work will begin on the lower floors as work on the superstructure moves upward. During this period, about 10 to 15 trucks per day will be required to haul the concrete to the site. The concrete will be raised by the tower crane and poured in place. In addition to the crane, the work crews will require at least one compressor, welding machines, masonry saws, and some miscellaneous pieces of construction equipment.

The total work force during this phase will be about 45. The crew will include carpenters, ironworkers, electricians, steam fitters, plumbers, masons, general laborers, concrete workers and foremen.

3.4.4 Enclosure

The enclosure of the building will begin in month seven, about a month after the construction of the superstructure

is initiated. Enclosure will continue through month twenty. The operation will involve fastening the metal or porcelain exterior wall panels to the superstructure. A few heavy trucks per day will be required to transport the panels to the site. Little heavy equipment will be required other than the crane for this phase of activity. Total employment for the enclosure work should be about 37 persons.

3.4.5 Finish Work

The finish work will begin on the lower floor of the building as the superstructure and enclosure crews move upward. Beginning in the ninth month, several finish activities will be initiated on the lower floors. Finish work tasks include a wide variety of tasks. These include interior partitioning, drywall, lath and plaster, wall covering and painting, carpeting, mechanical systems, plumbing, tilework glazing, millwork, hardware installation, and landscaping. At any given time from month nine through twenty-four, a finish work crew of 100 will be present on-site.

Heavy truck deliveries will be minimal during this phase of construction. Light truck deliveries to the subcontractors, however, will increase to about six per day. The site work will also involve short-term deliveries of concrete, hot-top, curbing, and plantings and landscape materials in the last month of construction. During this period, a small backhoe and gradeall may be used.

3.4.6 Peak Construction Activity

In addition to showing activity by phase for each building, Table 3.4.1 shows peak cumulative construction activity for the construction period. Both cumulative on-site employment and total heavy truck traffic are indicated. The maximum employment level is estimated to be 182 workers from the thirteenth through the eighteenth months. The peak employment reflects the overlapping efforts of the superstructure,

enclosure and finish work crews during this time frame. During these months, the superstructure crew will be completing its work on the upper floors, the enclosure crew will be progressing through the middle floors, and the finish crew will be working on the lower floors.

Heavy truck activity peaks somewhat earlier. Maximum traffic is indicated in months three through six, particularly when excavation haulage overlaps with the arrivals of concrete for the foundation. The number of truck trips drops slightly, to about fifteen per day, with the completion of the foundation work. The major reduction of heavy-duty traffic, however, occurs at the point when the superstructure phases begin to taper off in the seventeenth month.

4. DESCRIPTION OF THE ENVIRONMENT OF THE AREA

4.1 Description of Development Site

4.1.1 Location and Existing Use

The project site is located in downtown Boston between Devonshire and Washington Streets in the block bounded by State and Water Streets (see Figures 4.1.1 and 4.1.2). It is presently a surface parking lot run by "Allright" (see Figure 4.1.3). The ground surface slopes downward from west to east, going from 36 feet elevation at Washington Street to 28 feet elevation at Devonshire Street. The project site is approximately one-half an acre. Access to the parking lot is from Washington Street opposite Pie Alley, and egress is on Devonshire Street. The present parking lot has a capacity of 75 cars. It is also used by pedestrians walking between Washington and Devonshire Streets.

4.1.2 Subsoil

In order to examine the subsoil at the site, Haley and Aldrich, Inc. contracted Guild Drilling, Company of East Providence, Rhode Island to make ten borings at selected locations. Two holes (B5 and B6) were made into observation wells.

Judging from the data collected, the soil overburden depth ranges from 75 to 85 feet and consists of 15 to 25 feet of miscellaneous fill over medium compact to very compact natural soils. There were no organic soils encountered on the site. The material overlying the glacial till ranges from 30 to 50 feet in thickness. These deposits are variable and range from silty clay to sandy gravel and include patches of sand.

The surface of the Glacial till begins at elevations of -16 to -35 and slopes downward in an easterly direction. The till is non-stratified and consists of gravel, sand, silt, and clay, with some boulders and cobbles.

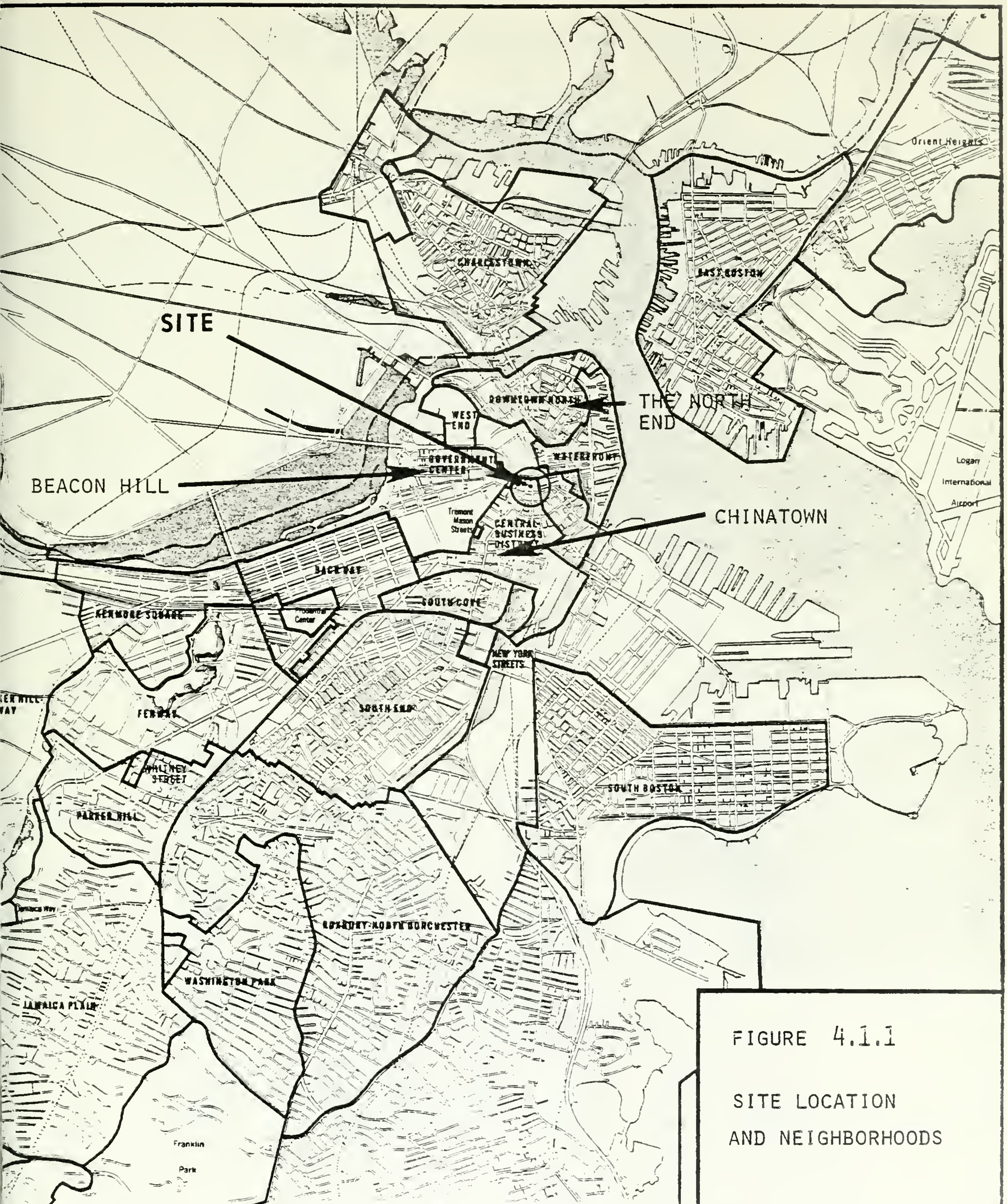


FIGURE 4.1.1

SITE LOCATION AND NEIGHBORHOODS

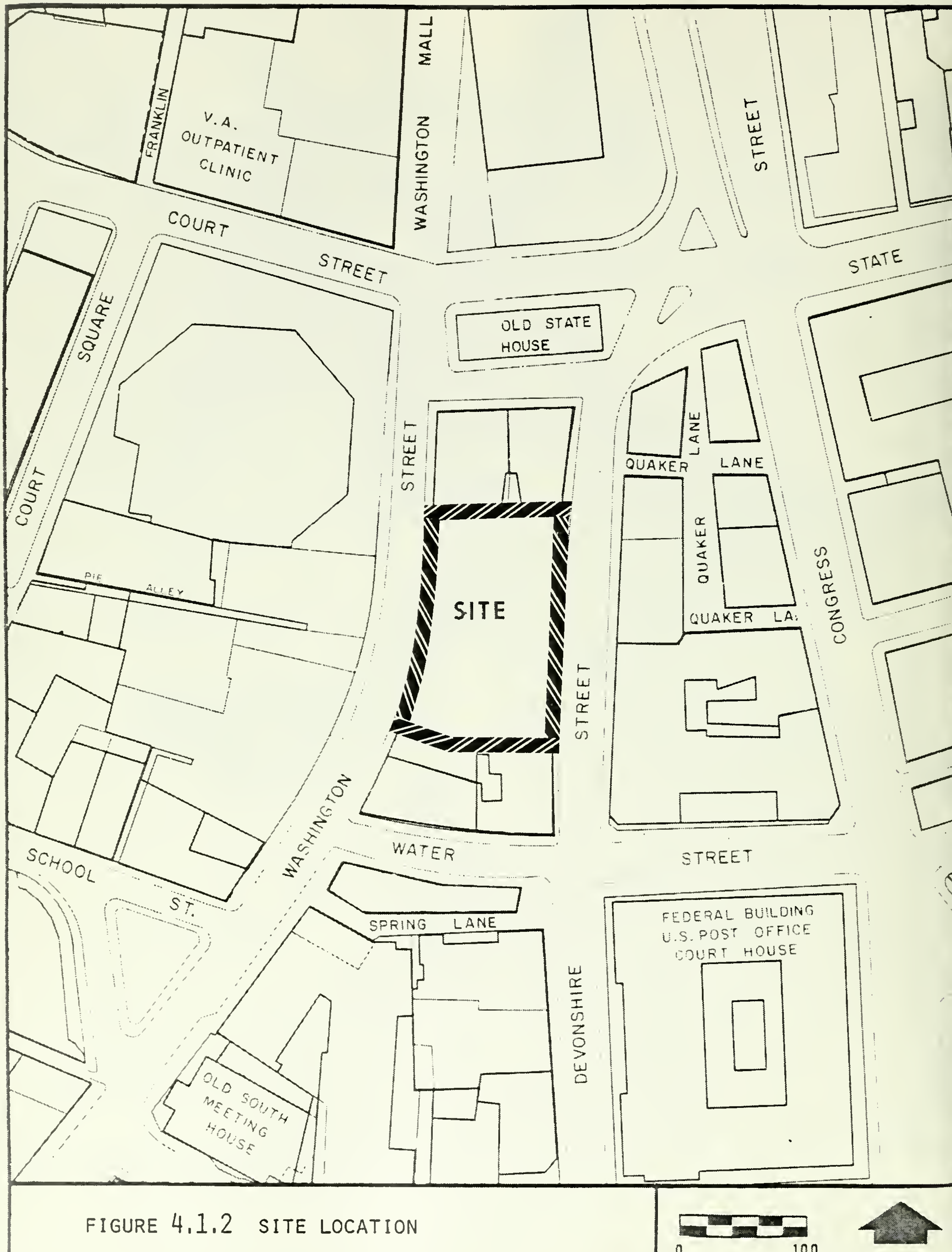
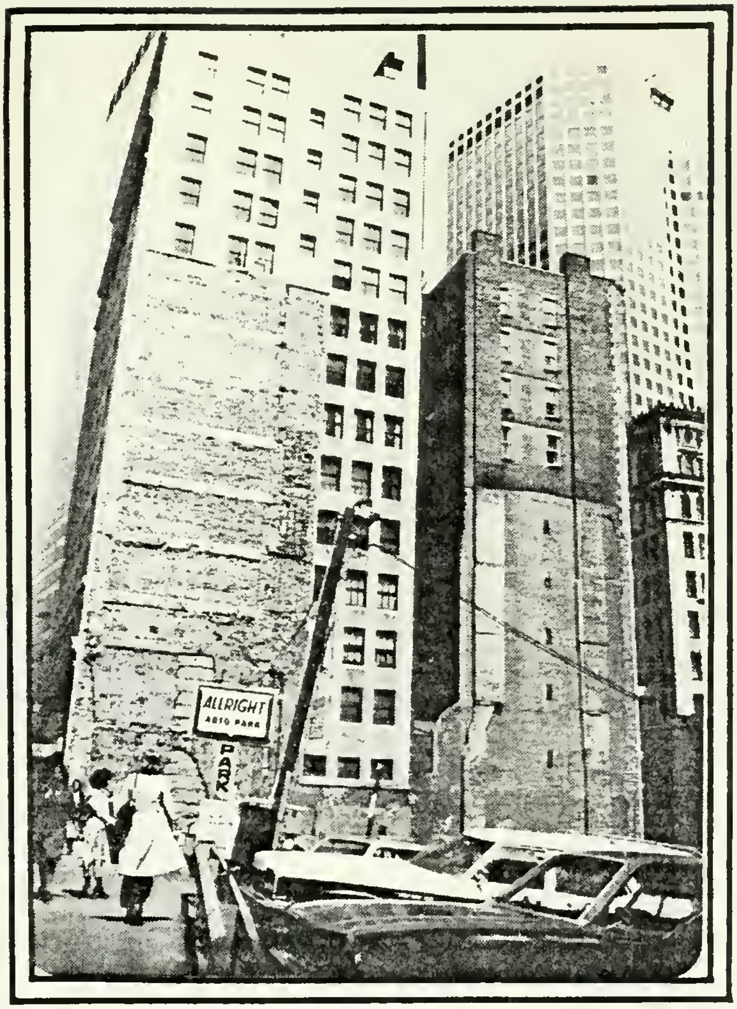


FIGURE 4.1.2 SITE LOCATION



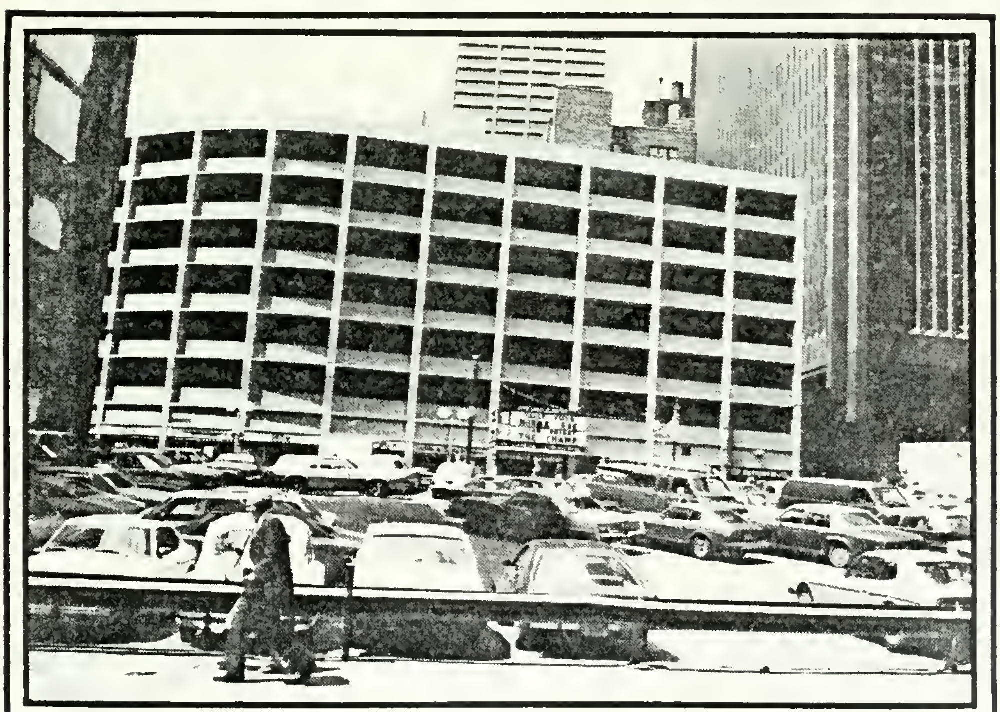


FIGURE 4.1.3 EXISTING AND ABUTTING LAND USES

The bedrock begins at elevations of -44 to -53 and is an Argillite; typical of the Boston area. Ground-water is observed at +3 to -5 feet.

This soil structure has been judged to be suitable for supporting a building such as Devonshire Towers. A direct spread footing or mat type foundation is planned. There are local areas of clayey soils which may require excavation and replacement to limited depths during final stages of excavation.

The lowest level of the proposed building would come within close proximity to the ground-water level. This does not present any serious problem with regard to construction dewatering.

4.2 Description of Abutting Land Uses

4.2.1 Setting of Site

The site of the Devonshire Towers project lies in the heart of the Central Business District (CBD) of Boston between the financial core to the east and the retail core to the west and south. It is surrounded by retail outlets, restaurants, office buildings, and other non-residential uses typical of downtown urban areas (see Figure 4.2.1).

Washington and Devonshire Streets carry a large volume of pedestrian and automobile traffic. The area is very busy during the day, especially during the morning and evening rush hours and lunchtime. The area is used by shoppers, businessmen and tourists alike.

4.2.2 Abutting Land Uses

West of the Site

Figure 4.1.3 shows the land uses abutting the west side of the site across Washington Street. Opposite the southern end of the site is a discount drug store. Next to that is a clothing shop. The Pie Alley movie theater is next to that.

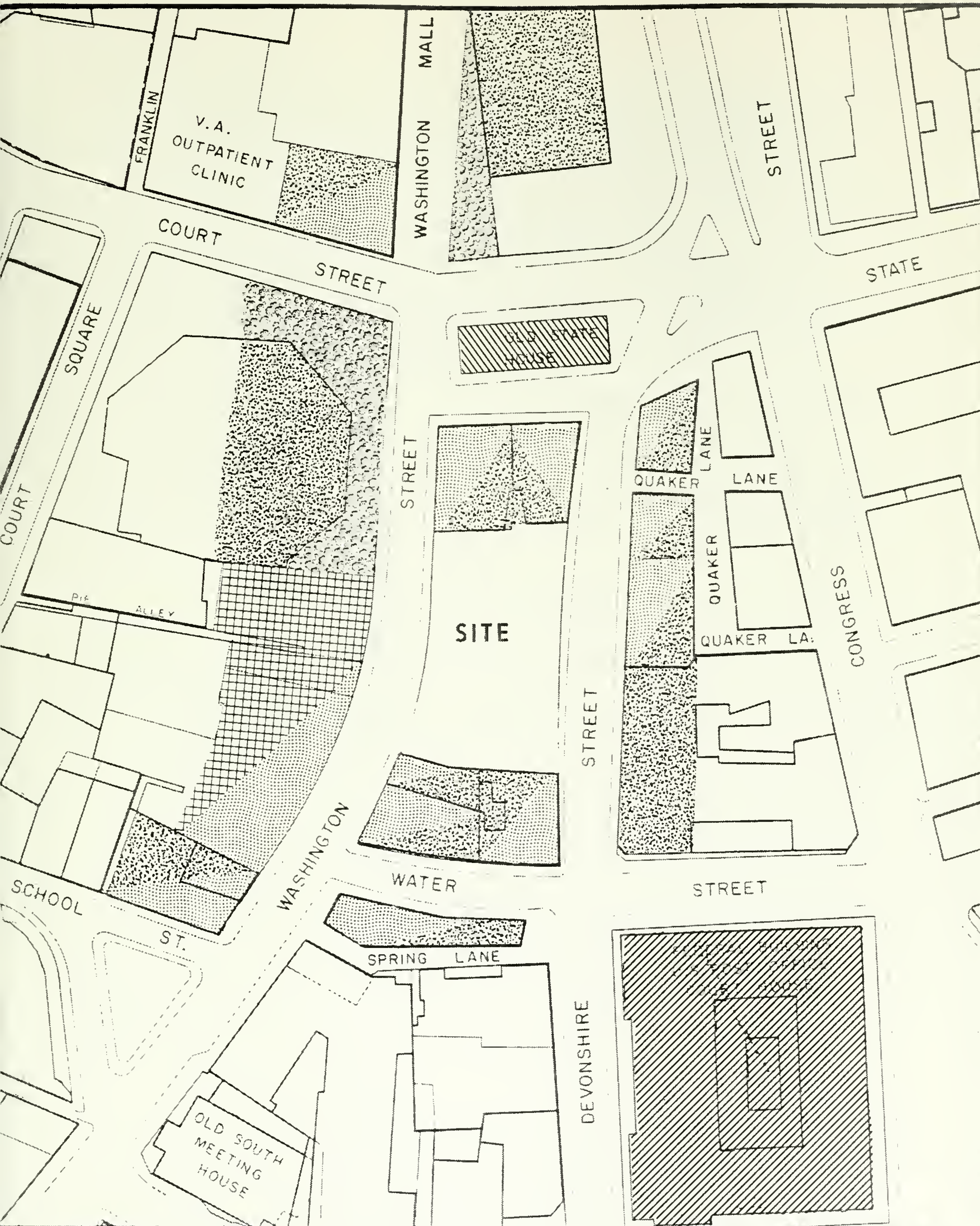


FIGURE 4.2.1 LAND USES ABUTTING THE SITE

KEY TO FIGURE 4.2.1

COMMERCIAL	
OFFICE	
OPEN AREA	
INSTITUTIONAL	
PARKING	

On the other side of the Pie Alley Theater is a coffee shop. Above these street-level retail outlets are six levels of garage parking. The entrance to the garage is between the coffee shop and One Boston Place. The office tower at One Boston Place is opposite the northwest corner of the site. This high-rise building is approximately 45 stories tall. In front of the building is a mini-plaza with benches and trees (see Figure 6.1.1). The ground floor of One Boston Place houses a retail stock outlet.

North of the Site

Abutting the site on the northwest corner is a small coin and stamp store. Beside it is a branch office of the Suffolk Franklin Savings Bank. The upper 14 levels of this building contain office space.

The building on the northeast corner of the site houses the National Historic Parks Visitors Center on the street level. This is tourist information facility. There is office space on the upper nine floors.

East of the Site

Figure 4.2.2 shows the land uses abutting the site to the east across Devonshire Street. Across the street from the northeast corner of the site is a discount drug store. Adjacent to this are several clothing stores, a restaurant and entrances to the offices on the upper floors.

The building opposite the southern half of the site is used for offices right down to the street level. It contains no retail space.

South of the Site

The building abutting the site to the south on Devonshire Street houses a rare coin gallery on the ground floor. Above this, there are five levels of offices. The building which abuts the site to the south on Washington Street contains retail outlets on the street level, and offices above.

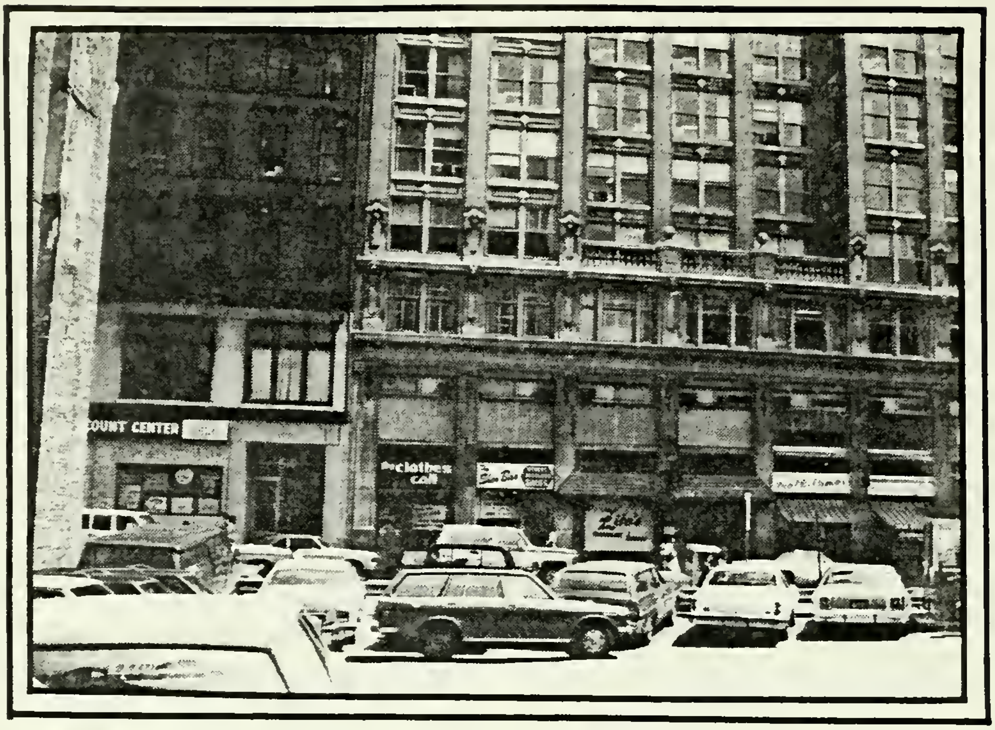


FIGURE 4.2.2 ABUTTING LAND USES ON DEVONSHIRE STREET

4.2.3 Other Land Uses in Immediate Vicinity of Project Site

The most prevalent land uses in the immediate vicinity of the project consist of retailing, parking, and offices. There are several buildings in the nearby area which vary from the surrounding buildings in use and character.

Figure 4.2.3 shows the three skyscrapers close by which stand above the surrounding buildings. One of them, One Boston Place, abuts the site and is described above. The other two are located at 28 State Street and 60 State Street. These buildings lie to either side of the State and Congress Street intersection to the north of State Street. They rise approximately 45 stories. The Devonshire Towers Building will be 40-stories tall.

Also in the immediate area are several National Historic Landmark Sites. These are fully described in Section 6.2 and are shown on Figure 6.2.1. Three of the historic landmarks are used as commercial buildings which house retail and office space. Two of the historic sites nearby, the Old State House and the Old South Meeting House, are used as museums.

Two buildings in the immediate vicinity, the Old State House and the Winthrop Building house subway stations.

The building to the southeast corner of the site is the Federal Building, containing the District Court and the U. S. Post Office.

There are no major residential land uses in the immediate vicinity of the project site. Figure 4.1.1 shows the closest neighborhoods to the site. These include Chinatown, approximately six blocks (1/3 mile) to the south along Washington Street. The North End begins about 1/2 a mile to the north of the site. Beacon Hill residences start about 1/3 of a mile to the west of the site. None of these neighborhoods are close enough to be affected by the project during construction or operational phase.

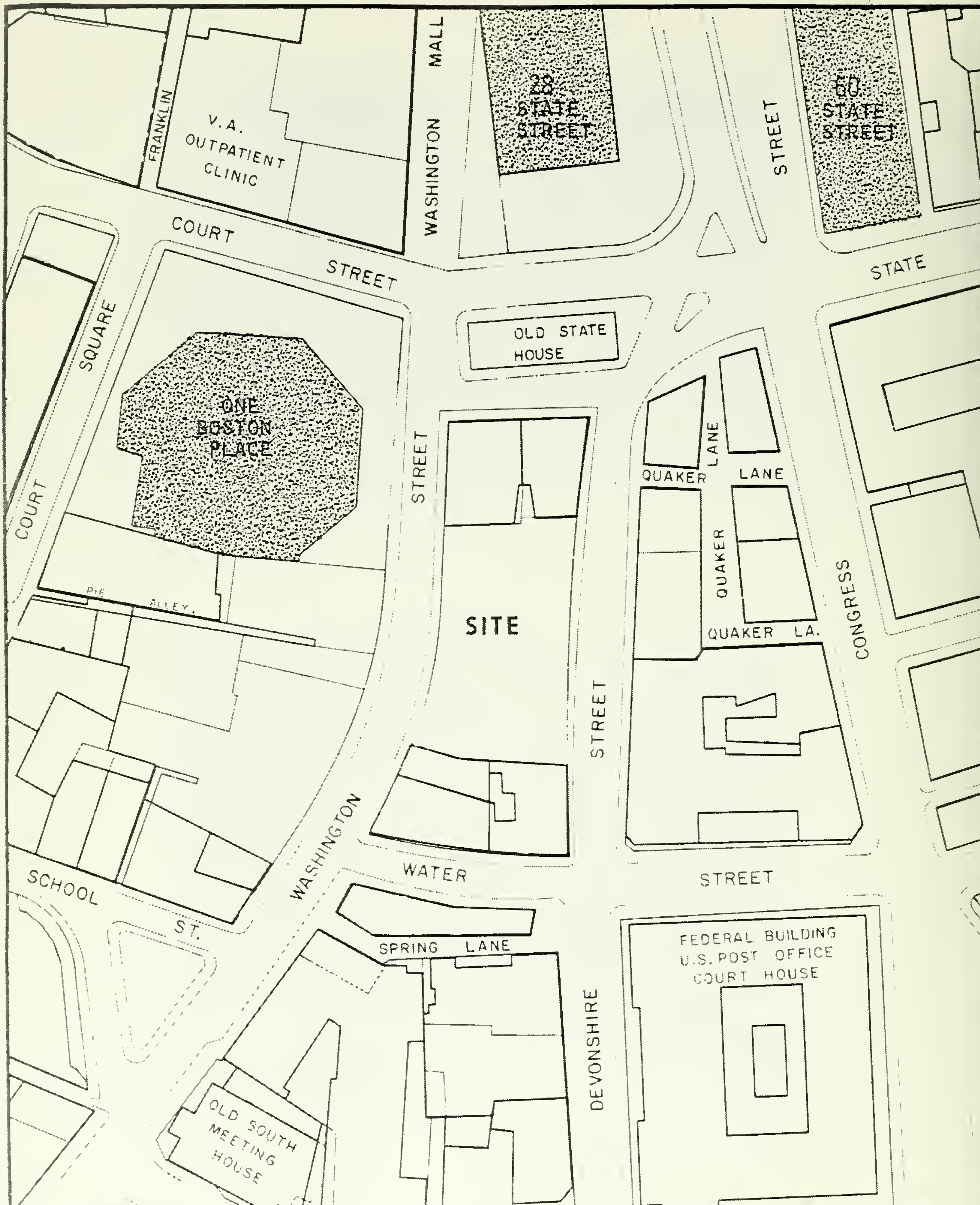


FIGURE 4.2.3 OTHER SKYSCRAPERS IN VICINITY

4.2.4 Zoning

Figure 4.2.4 shows that the Devonshire Towers site lies in the B10 zoning district. This is a retail business and office district. The maximum allowable floor area ratio (FAR) in this district is ten. The retail, office, residential, and health club uses planned for Devonshire Towers are all allowed in this district. The parking use associated with Devonshire Towers will require a permit from the Air Pollution Control Commission.

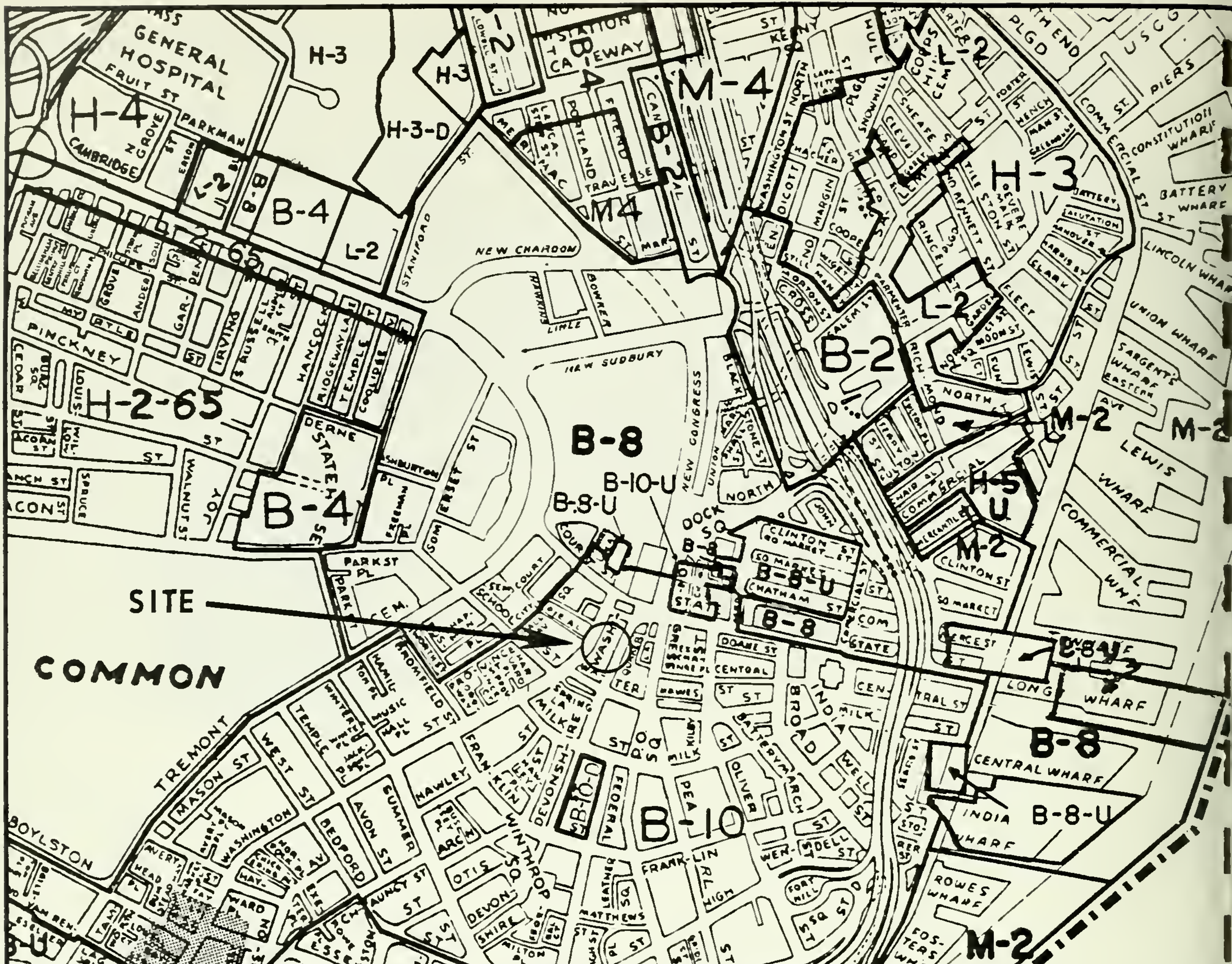


FIGURE 4.2.4 ZONING DISTRICTS SURROUNDING SITE

0 500

ZONING DISTRICTS
CITY OF BOSTON
MAP I BOSTON PROPER

USE	MAX FAR	RESIDENCE DISTRICTS
S-	.3 .5	SINGLE FAMILY
R-	.5 .8	TWO FAMILY 3 FAMILY, APTS
H-	1 2 3 4 5	APARTMENTS

USE	FAR	BUSINESS DISTRICTS
L-	.5 1 2	LOCAL RETAIL & SERVICE STORES
B-	1 2 4 8 10	RETAIL BUSINESS & OFFICES

USE	MAX FAR	INDUSTRIAL DISTRICTS
M-	1 2 4 8	LIGHT MANUFACTURING
I-	2	GENERAL MANUFACTURING
W-	2	WATERFRONT INDUSTRY

ZONING DISTRICT BOUNDARY
RESTRICTED PARKING DISTRICT BOUNDARY
(E) DISTRICT ADULT ENTERTAINMENT OVERLAY
PREPARED BY THE BOSTON ZONING COMMISSION
Scale in Feet: 400 0 400 800 1200

FIGURE 4.2.4 CONTINUED

5. ALTERNATIVES TO THE PROJECT

The Executive Office of Environmental Affairs (EOEA) has determined that the alternatives considered shall be the "no-build" base condition and the proposed action, including any design modifications proposed during the compilation of the EIR. In determining that the "no-build" is the only alternative to be considered, EOEA has recognized some of the constraints to developing the proposed site privately. While a public agency might feasibly sponsor a less intensive use, costs which confront private developers require that relatively intense development be undertaken. Development of a smaller structure, or reduced lot coverage cannot provide a reasonable return on investment. For this reason, the basic height and mass of the building is predetermined, if developed by the private sector.

Proceeding with the "no-build" alternative is basically a decision to maintain the parking lot use of the site. The impacts associated with such a decision are largely the impacts of lost opportunities to improve the site to a better, more visually appealing, and income-generating use. The impacts will be manifested in the form of lost tax revenue to the City of Boston. Likewise, the parking lot site will continue to be an eyesore to visitors and abuttors to the site.

In Section which follows, impacts are addressed primarily for the proposed Devonshire Towers design. The impacts are discussed in the context of changes from the parking lot, or "no-build", alternative.

6.0 PROBABLE IMPACT OF THE PROJECT ON THE ENVIRONMENT

6.1 Shadow and Wind

Shadow

To date, shadow studies have focused on noontime effects. This is deemed the time period of greatest impact due to high out-of-doors activity during lunchtime. Similarly, the effort has focused on the months of March through October. These are the months of interest because outdoor activity is highest.

The noon shadows cast by the Devonshire Towers project will fall on the land uses north of the project site along Washington Street toward State Street. During the summer months, when the shadow is short, it will not cross State/ Court Street. At this time of year, the bearing of the sun will cause the noon shadow to fall toward One Boston Place, shading the mini-plaza in front of the building. Figure 6.1.1 shows this plaza at noon, in April, without Devonshire Towers. As the sun moves away from the summer equinox, its bearing changes and the noon shadow rotates northward toward 28 State Street and Washington Mall. At this point, it will cover the Old State House.

Impacts

The places in the area surrounding the site on which shadowing causes the greatest negative impact are the open plaza areas. There are two such open areas near the Devonshire site; the mini-plaza in front of One Boston Place, and Washington Mall. Both of these will be shadowed by Devonshire Towers, as described above.

This shading will be more significant for the One Boston Place Plaza, because shading will occur during summertime lunch breaks, the period of peak usage by pedestrians who stop and rest there. Washington Mall will be under the noon shadow during the period from the end of August to the latter

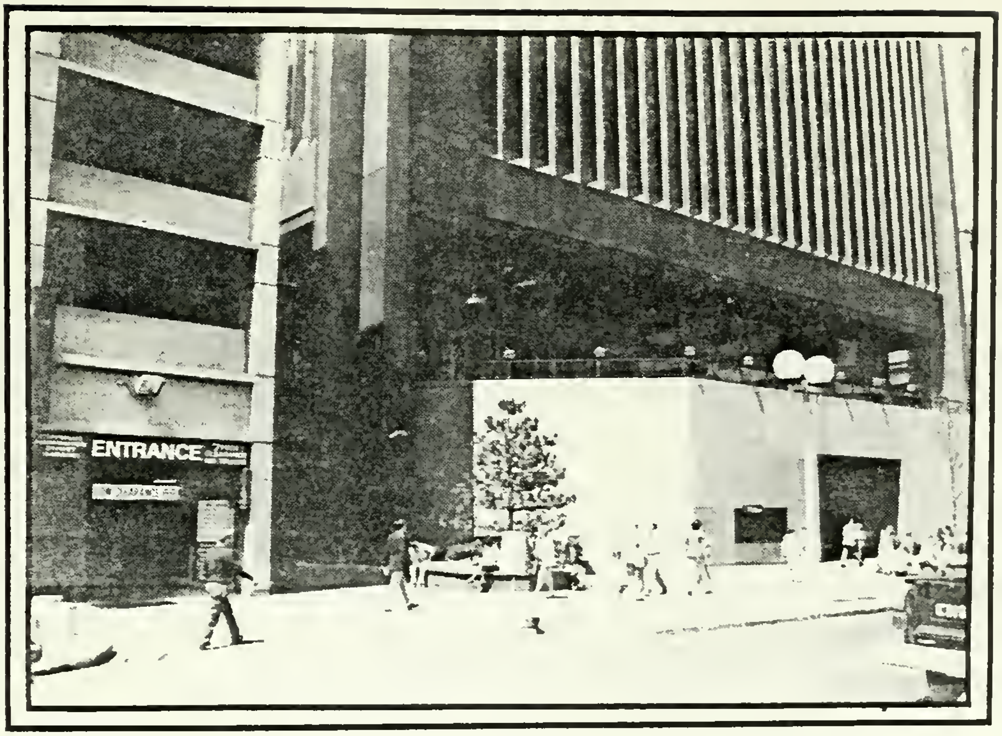


FIGURE 6.1.1 MINI-PLAZA AT ONE BOSTON PLACE

part of April. While there may be heavy usage by pedestrians on some warm days, use would not be consistently as heavy as during the summer months when the Mall would not be affected by the shadow from Devonshire Tower.

Sidewalks along parts of Washington Street and State Street will also be shaded by Devonshire Towers. This will not cause as significant an impact as the open-area shading because the usage is for transportation rather than for sitting and resting.

The Old State House will be more shaded than before, mainly during the summer when the sun's angle is higher. The cupola and tower atop the building will be the only part of it that will receive shading other than currently received from existing buildings.

Wind Effects

Effects of Wind in Urban Areas

In major urban development projects involving "tall buildings", wind issues generally warrant attention. There are three types of potential wind impacts. These are:

1) negative impacts on ground-level pedestrian activities;
2) effects upon structural elements subjected to wind loadings; and
3) creation of local air quality hot spots.

Since the project is currently in a preliminary design stage, wind studies available at this time are subjective in nature. Wind-tunnel personnel have coordinated with the architectural staff to review project designs. Through these consultations, subjective analysis of potential aerodynamic problems with project plans has been provided.

Pedestrian Level Wind Effects

A major contribution to the wind problems encountered by pedestrians near tall buildings arises from the way tall buildings deflect or "pull down" faster speed winds from a greater height. It is this interaction between a building and the wind velocity profile in the earth's boundary layer that is primarily responsible for many of the pedestrian level wind problems associated with "tall buildings".

The degree to which wind degrades the value of a given location is not simply a function of wind speed. It depends on temperature and precipitation conditions, as well as the type of activity intended for the area. For example, a sheltered reading or meeting area would be severely degraded by winds which may be quite tolerable on a street.

A recent NSF funded study* has suggested guideline standards for acceptable levels of wind activity for various site usages, e.g., pedestrian egress paths near high-rise buildings, street and arcade shopping areas, open parks and palzas, etc. The suggested standards are reproduced in Table 6.1.1.

This table indicates that for safety, pedestrians should not be exposed to areas where the 1-hour average wind speeds exceed 20 mph more than 0.1% of the time, i.e., on more than about one-half day per year.

For street and arcade shopping areas, it is recommended that 1-hour average wind speeds should not exceed 14 mph more than 5% of the time, or about 1-1/2 days per month.

For open air plazas designed for sitting or outside dining, it is recommended that the 1-hour average wind speed should not exceed 5 mph more than 20% of the time, or approximately six days per month.

---

*"Pedestrian and Wind in the Urban Environment", H. Cohen, I. I. McLaren et al., University of Massachusetts/IME/R-77/13.

TABLE 6.1.1

PEDESTRIAN SAFETY/COMFORT STANDARDS FOR URBAN WINDS

	Suggested Standards	
Activity Area	One-Hour-Average Wind Speed	Permitted Occurrence Frequency
All pedestrian areas -- limit for safety	20 mph (9.1 m/sec)	0.1%
Major walkways, especially principal egress path for high-rise buildings	20 mph (9.1 m/sec)	0.1%
Other pedestrian walkways, including street and arcade shopping areas	14 mph (6.4 m/sec)	5%
Open plazas and park areas, walking, strolling activities	8 mph (3.6 m/sec)	15%
Open plaza and park sitting areas, open-air restaurants	5 mph (2.3 m/sec)	20%

Source: Pedestrian Wind Effects at the Park Plaza Project, Boston, MA, by T.I. McLaren. Submitted to the Boston Redevelopment Authority, 1975.

The NSF study pointed out that the characteristic gustiness of winds near high-rise buildings could generate gust speeds of more than three times the average pedestrian wind speed near the building. Hence, a 1-hour average 20 mph wind speed at street level implies that there is potential for occasional gusts over 60 mph. Such levels can be hazardous to pedestrian balance and safety. There are strong economic factors involved with high winds as well. In one test site for the NSF study, a significant reduction was noted in the number of retail cash register transactions on "windy" days.

Non-Urban Baseline Wind Conditions in the Boston Area

These guideline standards may be given some perspective by comparing the naturally occurring wind speeds at Logan Airport. Appendix A shows the wind rose for annually averaged wind speeds at Logan. The occurrence frequencies are broken down by wind speed and direction. The most frequent winds at Logan are from the northwest and southwest quadrants.

The Logan wind data are measured at a very exposed location close to the water and at a height of 10 meters (33 feet) above ground. This may be translated into equivalent pedestrian height wind speed occurrences as presented in Table 6.1.2 (percent figures have been rounded off in this table).

The naturally occurring wind conditions at an exposed location at Logan Airport far exceed the standards suggested in Table 6.1.1. While wind characteristics at the Devonshire Towers site may vary considerably from those at Logan due to a difference in site characteristics, it is quite probable that wind speeds at the project site also exceed the criteria expressed in Table 6.1.1.

TABLE 6.1.2

FREQUENCY DISTRIBUTION OF WIND SPEEDS AT PEDESTRIAN LEVEL

Pedestrian Wind Speed	Occurence Frequency at Logan Airport
Total over 20 mph	2%
Total over 14 mph	15%
Total over 8 mph	47%
Total over 5 mph	78%

Subjective Assessment of Potential for Wind Impacts

The Devonshire site is in close proximity to a number of Boston's high-rise buildings, including One Boston Place (The Boston Company Building), and 28 State Street (The New England Merchants Bank Building). It is generally recognized that the pedestrian wind environment at locations adjoining these buildings can be highly undesirable. On the basis of wind tunnel studies involving adjacent areas of Boston, it is clear, in retrospect, that pedestrian wind conditions at some present day street locations in this area exceed the safety levels suggested in Table 6.1.1. Thus any development proposed to a height of approximately 400' in this locale should clearly focus on the details of the local modified wind environment. The wind consultant has indicated that wind tunnel testing, before proceeding with final design is warranted. Devinshire Associates have agreed to sponsor this testing prior to breaking ground.

In the Boston area, prevailing winds are from the northwest quadrant in winter and from the southwest quadrant in summer. This indicates that the Washington Street sidewalk will probably be subjected to frequent and high speed winds. The impact of this on pedestrians will depend on final design details such as whether or not canopy-style projections, recessed walkways, or sunken walkways may provide local shelter.

The proposed walkway near ground level to link Washington Street and Devonshire Street should be examined very carefully to avoid creating a natural wind tunnel between these two thoroughfares.

The Devonshire Street sidewalk may be subjected to increased wind speeds near the new tower, though not so frequently as on Washington Street because of the site orientation.

The decks indicated above Office Level 5, adjacent to the Community/Mechanical floor area, will probably be subject to

increased levels of wind activity and should be tested in detail during the wind tunnel modeling if these areas are to be used for general access.

Wind tunnel testing will also focus on the Roof Top area which will offer sundeck and swimming pool facilities. Depending on the final design details, this area could be subject to high wind speeds, either due to air flow over the building, or to the turbulent wake flow resulting from the presence of adjacent high-rise buildings. The dispersal patterns of effluents from the neighboring high-rise should also be examined to see if they will impact on this roof top activity area.

Structural Considerations

Wind flow around an obstacle such as a high-rise building generates a wake region typically up to 5-10 building dimensions downstream. This wake is characterized by its turbulent nature and the most intense turbulence is within 1-2 dimensions downwind of the structure. The new tower will be within the near-wake region of One Boston Place for northwesterly winds, and to a lesser degree the wake region of 28 State Street for northerly winds. Thus, the dynamic loading on the new building will be examined carefully to ensure that bending moments and surface cladding pressures on the new tower are properly anticipated. This will be done through the wind tunnel study on a model of the project area, once design plans have been finished on the basis of economic/aesthetic considerations. Then, if necessary, ameliorative measures will be suggested and tested for effectiveness before construction begins. In this way, the well being and comfort of pedestrians will be ensured.

6.2 Historical Resources

6.2.1 Description of Resources

Figure 6.2.1 shows the five buildings in the immediate area of the site which are listed on the National Register of Historic Sites. It also shows the route of the Freedom Trail as it passes the site along Washington Street. Figure 6.2.2 shows several historic properties close to the site. The Old State House, built in 1712, is located one-half a block to the north of the site on State Street. The Old State House was built to replace an earlier structure which was destroyed in the great fire of October, 1711. It is the oldest existing public building of Georgian design in the United States. It served as the center of Massachusetts government from its erection until 1798, when the new State House was built. The building is now open to the public as a museum and houses the Bostonian Society and an MBTA station.

The Ames Building, built in 1889, is located at One Court Street. This nine-story building is an example of Richardsonian architecture and was Boston's first skyscraper. It is now a private office building.

The Winthrop Building, located half a block from the site, is visible in Figure 6.2.2(B). It lies between Water Street and Spring Lane. Built in 1894, it was the first building in Boston to be built with a steel skeleton. Another unique feature is the fact that it was fireproof when built.

The Old Corner Bookstore, built in 1711, is located at the corner of Washington and School Streets, opposite the Winthrop Building. It is the only 18th Century house remaining in the Central Business District. In the mid-19th Century it was the home of Ticknor & Fields, the notable publishing house in America. Later, it was a meeting house for literary greats, including Emerson and Hawthorne. These are the bases for which it is certified as an Historic landmark.

Figure 4.2.2(B) also shows the Old South Meeting House. It is one and one-half blocks away from the proposed site,

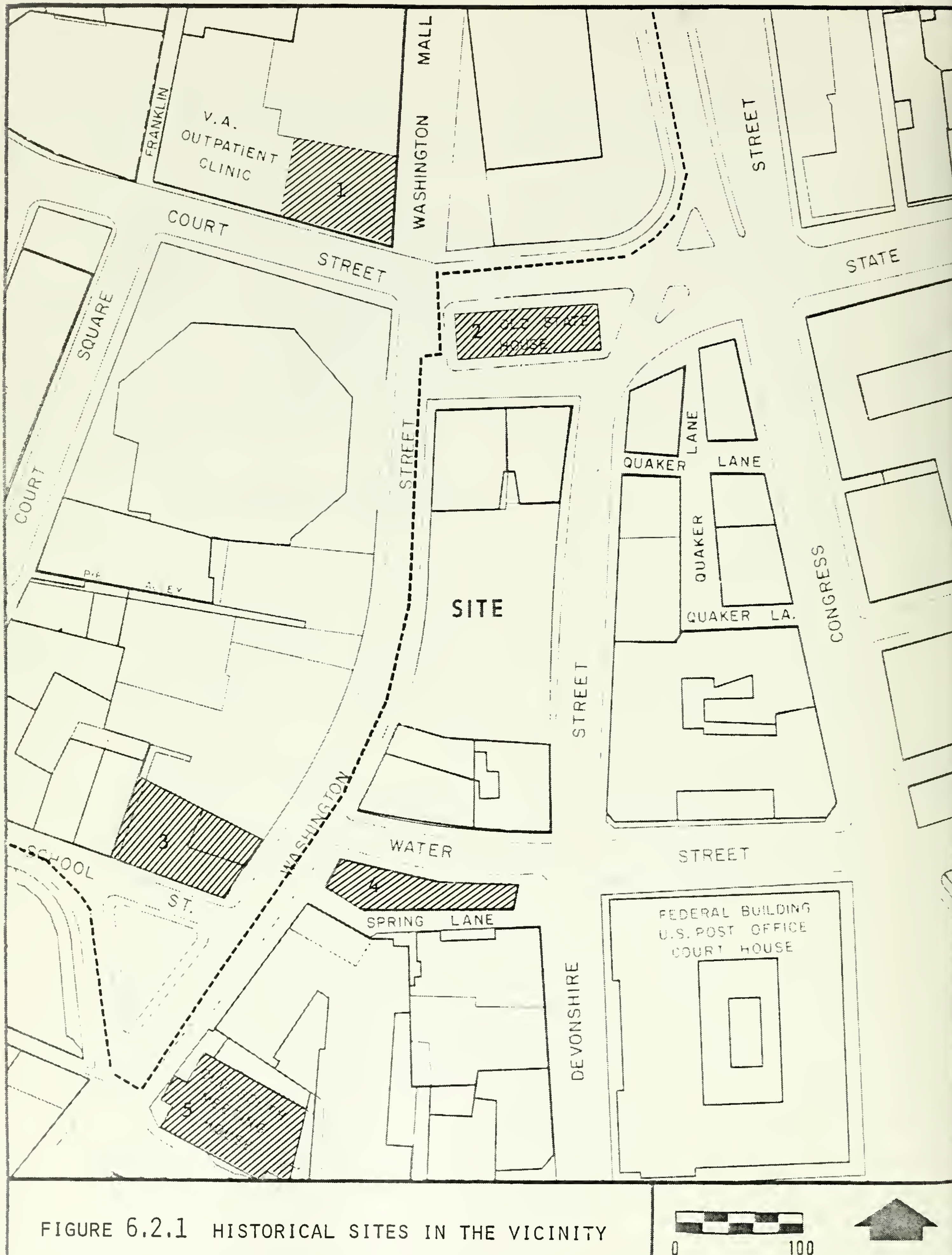


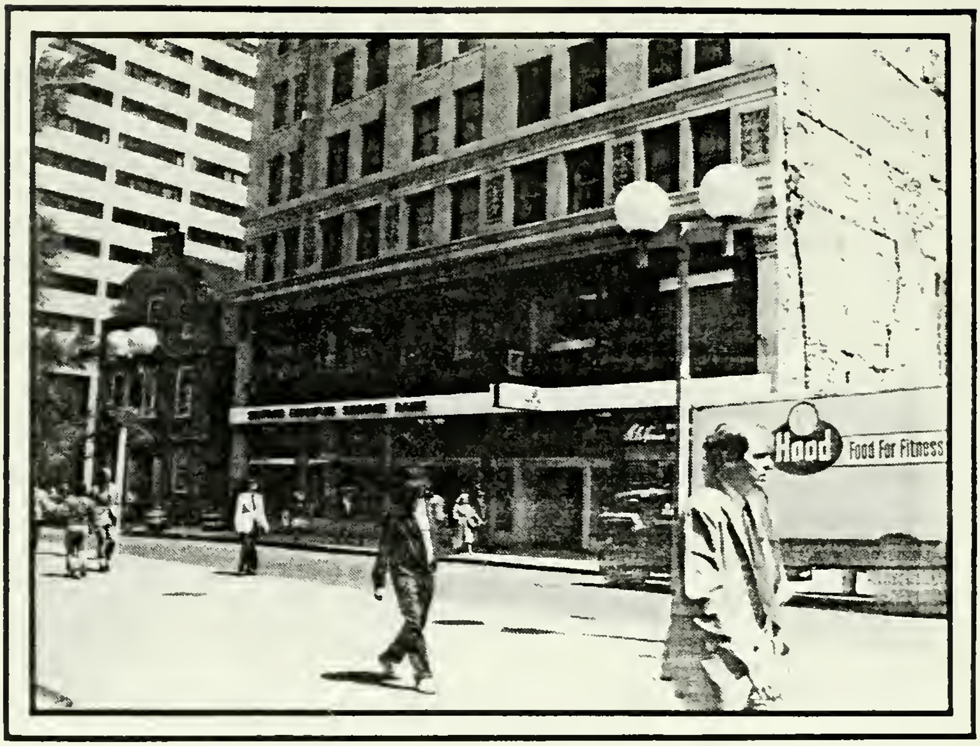
FIGURE 6.2.1 HISTORICAL SITES IN THE VICINITY

----- FREEDOM TRAIL

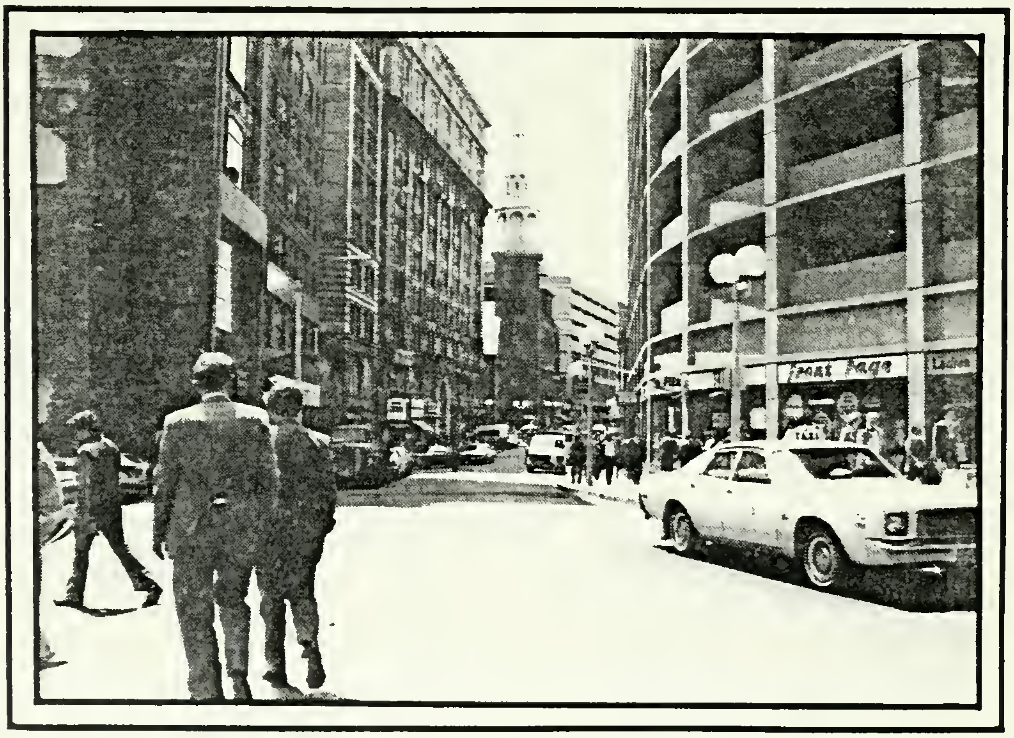
1. AMES BUILDING
2. OLD STATE HOUSE
3. OLD CORNER BOOKSTORE
4. WINTHROP BUILDING
5. OLD SOUTH MEETING HOUSE

FIGURE 6.2.1, CONTINUED

KEY TO HISTORICAL SITES



A.



B.

FIGURE 6.2.2 HISTORICAL SITES IN THE VICINITY

at the corner of Milk and Washington Streets. This famous building was erected in 1729 and is an example of a colonial church that combines the "new" Early Georgian exterior and tower with the traditional seating plan of the 17th Century four-square meeting house. This was the scene for a number of important assemblies during the period just prior to the outbreak of the Revolution. It was from the Old South Meeting House that the Boston Tea Party was launched. It is presently used as a museum.

Another historical resource adjacent to the site is the Freedom Trail. Figure 6.2.1 shows the route of the Freedom Trail as it runs along Washington Street. The trail comes down School Street to the Old Bookstore. It turns right on Washington Street to the Old South Meeting House. From there, it goes north on Washington Street to the Old State House, passing directly by the project site.

6.2.2 Adverse Impacts

Construction Phase

During the construction phase of the Devonshire Towers project, the three main impacts which may have an effect on nearby historical resources are 1) increased noise level, 2) increased traffic congestion, and 3) aesthetic nuisance associated with construction activities. Increased noise will be due to both heavy trucks moving to and from the site and activity on the site (see Section 6.5). Congestion will result from the incremental increases in traffic and the temporary obstructions to automobile movement on Washington and Devonshrie Streets during the construction process. Debris and solid waste will detract from the visual quality of the area in the short-term.

Officials consulted with regard to negative impacts on historic resources which will be associated with the construction of Devonshire Towers stated no perceptions of particular concerns. Past construction of large buildings in the area

has caused no reported problems. The negative impacts felt will be the aggravation associated with the construction phase of any project. The duration of these impacts will be approximately 24 months.

The nearby historic sites will be affected to varying degrees by these impacts. The Old State House will be affected by the increased noise level and congestion. The building is near the State Street - Congress Street intersection. It may be affected by any increase in traffic congestion there. Any traffic queuing on Devonshire Street due to constraints by the site will back up next to the Old State House. This will impact the Old State House in two ways. It will make verbal communication and the working environment more difficult for people employed in the building. It may also deter tourists from visiting the museum during peak construction activity.

The Old South Meeting House will be subject to the same impacts, resulting in the same effects as the Old State House. Construction will be unpleasant for employees, and may detract from museum business. The impact felt at the Old South Meeting House will be related to congestion at the Washington Street - School Street intersection. This intersection may slow down due to constrained traffic along Washington Street during certain limited periods of the construction phase.

The Ames Building will be impacted by the same sources as the Old State House; noise and congestion related to the Congress Street - State Street intersection. The effect of these impacts will be felt by the personnel working in the building and not tourists visiting it.

The Winthrop Building and the Old Corner Bookstore will be subject to the same impacts as the Old South Meeting House. These impacts will temporarily degrade the working environment for the buildings tenants and employees.

The Freedom Trail will be subject to a fairly large short-term impact during the construction phase of the project.

The activity, noise, congestion, and general ugliness associated with construction will directly impact the portion of the Freedom Trail between the Old South Meeting House and the Old State House. This may cause tourists to avoid this portion of the historic trail, choosing to explore Boston via other routes instead. This may be especially true for large groups touring Boston with a guide who cannot lecture over the noise.

Operational Phase

Negative environmental impacts caused by Devonshire Towers in its operational phase fall into three categories; wind, traffic, and shadowing.

Any tall building may affect the wind patterns at street levels (see Section 6.1). If wind streams are affected so that they increase their velocity at one of the nearby historic sites or along the Washington Street leg of the Freedom Trailk this could cause negative impacts on people using the historic resources or working in them.

Devonshire Towers will not cause a large increase in traffic, since access is mainly by foot and subway (see Section 6.3). All four of Boston's subway lines have stops nearby. The potential for increased traffic flow is most directly related to the increase in the available parking spaces generated by the multi-level garage. The number of parking spaces will increase from 75 to 150.

Three of the historic sites are located to the south of the site and will not be affected by shadowing from the building. The other two, the Old State House and the Ames Building, lie to the north and will be affected by shadowing (see Section 6.1.1).

The Freedom Trail will be positively affected by the project because it will eliminate an eyesore from the street and replace it with an attractive pedestrian mall.

Archeological

The lot in which the site is located was once the Boston Globe building, which was built in the late 19th Century. Therefore, any possible archeological resources which may have been located on the site are no longer present. Appendix B is a letter from the Boston Historical Commission's State Archeologist, who has explained that the project has no potential to adversely affect archeological resources.

6.3 Traffic

6.3.1 Description of the Existing Environment

The proposed site is located in downtown Boston, just north of the main shopping area. The narrow streets which surround the site are typical of those arising from colonial development. Washington Street on the west, and Devonshire Street on the east, bound the site directly, carrying northbound and southbound traffic, respectively. Water Street to the south and State/Court Street to the north provide east/west access (see Figure 6.3.1). Virtually all thoroughfares in the downtown area are traffic controlled via signalization at major intersections. Direction of traffic flow is usually restricted, and little or no space is allocated for on-street parking. All of these conditions prevail in the project area.

Traffic volumes have been recorded by the City for three intersections near the site: Water/Devonshire; Washington/Court/State; and Congress/Devonshire/State. Table 6.3.1 contains peak hour traffic volumes, as well as the computed capacities for these intersections. The capacities shown represent those for which a level-of-service "E" is provided, as defined in Chapter 6 of the Highway Capacity Manual*. At this level-of-service, a capacity which is in excess of

*National Academy of Sciences, 1965.

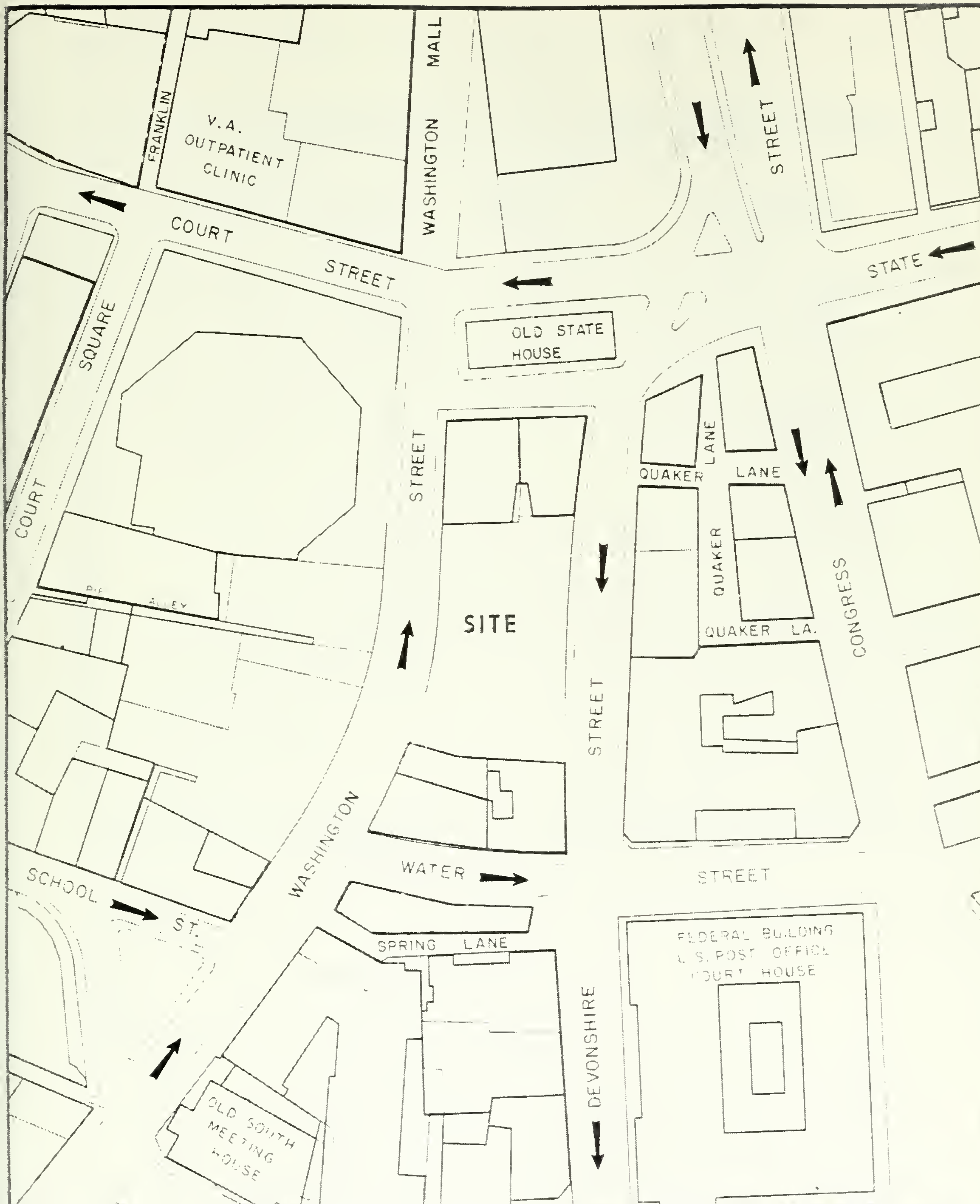


FIGURE 6.3.1 LOCAL TRAFFIC CIRCULATION

TABLE 6.3.1

TRAFFIC VOLUMES, CAPACITIES FOR INTERSECTIONS NEAR THE SITE

Approach Leg	Peak Hour Volume[1]	Capacity[2]	Demand Volume and Capacity
Water Street at Devonshire	345	865	0.40
Devonshire St. at Water	245	810	0.30
Washington St. at State/Court	650	752	0.84
State/Court at Washington	1,000	1,255	0.80
Congress/Devonshire (SB) at State	930	865	1.08
Congress (NB) at State	800	2,040	0.39
State at Congress	610	965	0.63

[1] Vehicles per hour.

[2] Vehicles per hour, level of service E.

demand volume can still result in considerable queuing of vehicles, since every traffic signal cycle is likely to have some, though not all, vehicles waiting at the end of the cycle.

Table 6.3.1 shows that the most constrained approach leg is that of Congress Street southbound, destined for either Devonshire Street or State Street (westbound). The reason for this constraint is the relatively narrow width of the right-turn exclusive approach at Congress, and the high number of turning movements here (see Figure 6.3.2). Any traffic destined for the site from the north will likely use this approach and continue south on Devonshire Street and enter the garage from there.

Traffic volumes have not been growing in this area as fast as the average for the metropolitan area, and this is to be expected for a downtown location. Based on many factors, including street network situation, few physical changes, and unfavorable conditions generally for traffic growth (supply and price of gasoline, congestion), it is likely that future growth will be less than 1% per year on streets surrounding the site.

The vast majority of persons entering the area travel underground transit routes and surface buslines. The site is within a one-minute walking distance of two subway lines and within five minutes by foot of the other two (see Figure 6.3.3). Bus routes criss-cross the downtown area three blocks away on Washington Street.

6.3.2 Construction Period Impacts

Construction worker vehicles will constitute the greatest burden to the street network during the construction period. Because space will be available on-site for virtually all workers wishing to drive, it was assumed that all who wanted to, would. Table 6.3.2 shows the monthly expected number of commuting vehicles (assuming a 1.1 vehicle occupancy

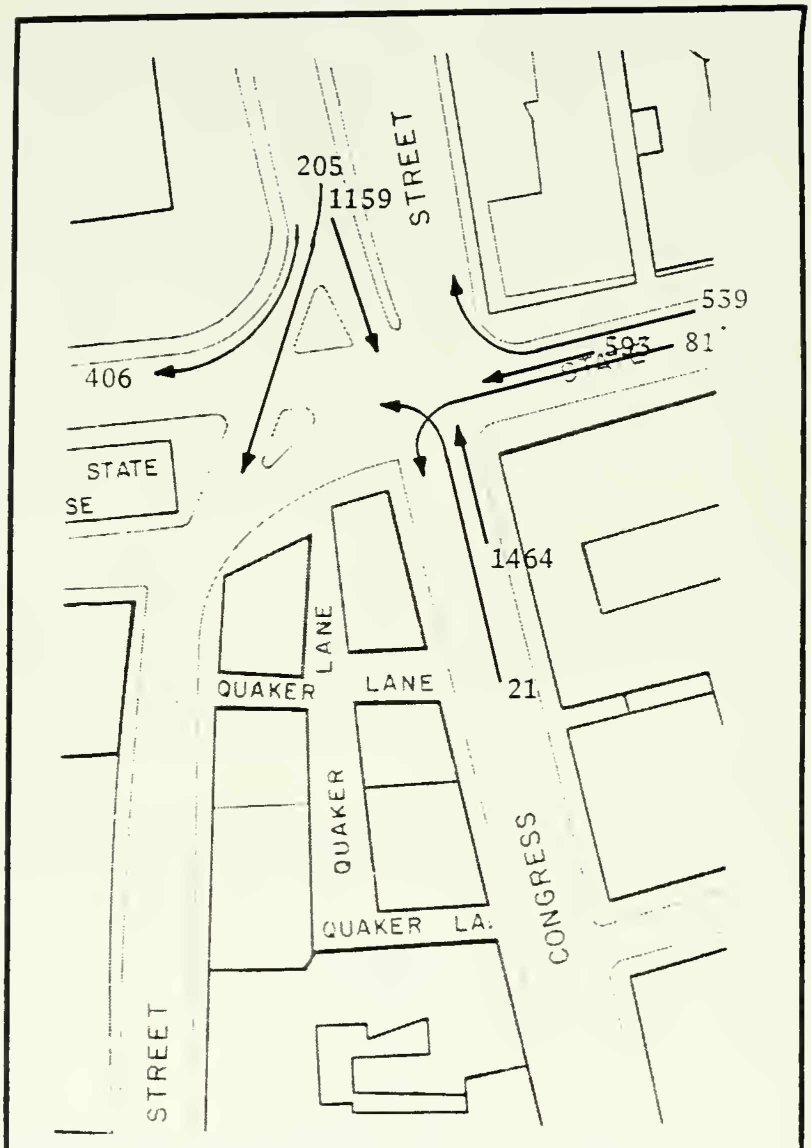


FIGURE 6.3.2 TRAFFIC MOVEMENT AT STATE/CONGRESS INTERSECTION

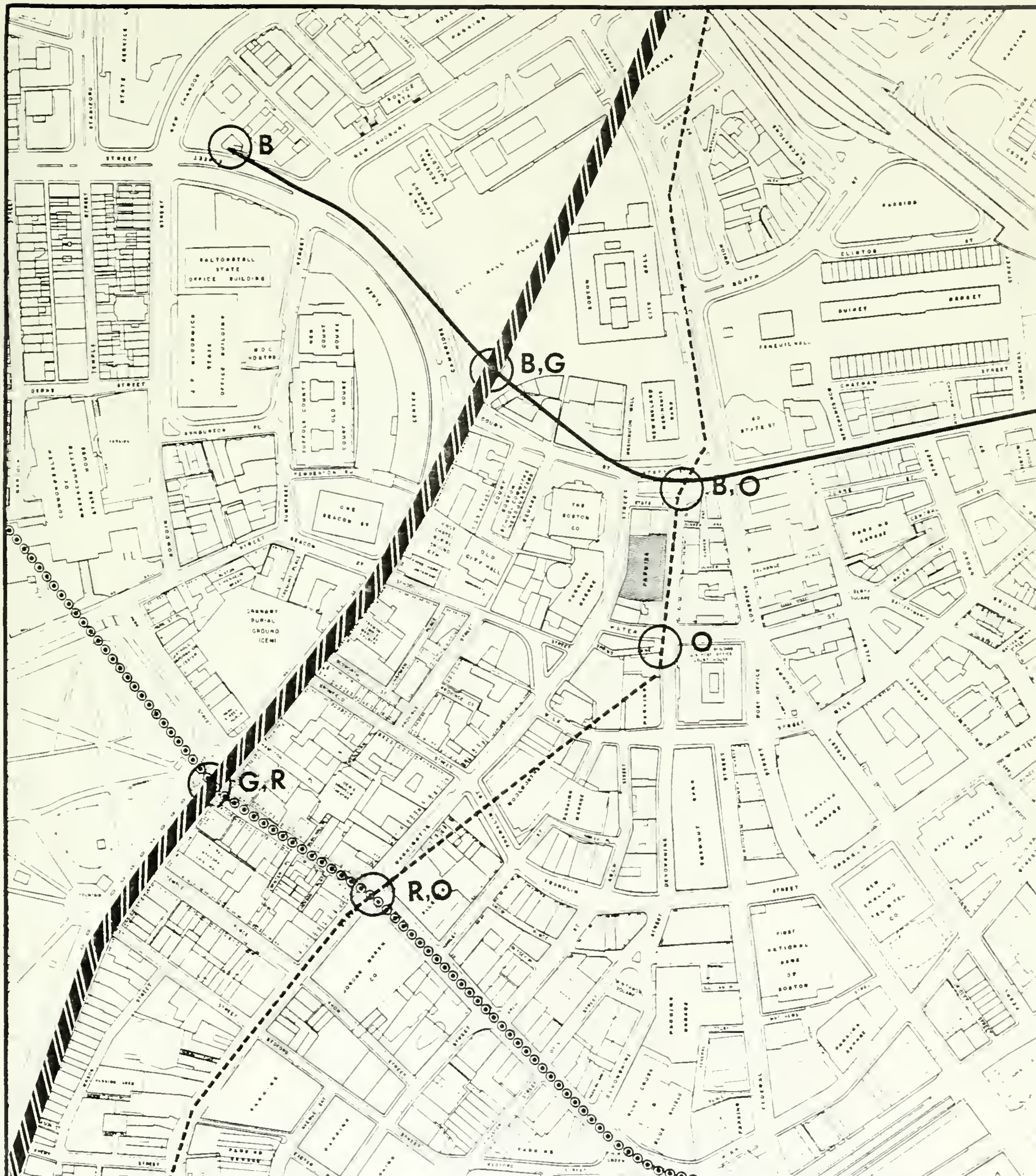


FIGURE 6.3.3 SUBWAY LOCATIONS

0 400

KEY TO SUBWAY LINES

GREEN LINE (G)

RED LINE (R)

ORANGE LINE (O)

BLUE LINE (B)

FIGURE 6.3.3 CONTINUED

SUBWAY LOCATIONS

TABLE 6.3.2

CONSTRUCTION PERIOD VEHICLE TRIPS, BY MONTH

	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Worker Vehicles[1]	5	45	45	45	41	82	75	75	129	129	147	147	165	165	165	165	165	165	125	125	73	55	36	36
Heavy Trucks	15	16	18	18	18	15	15	15	15	15	15	15	15	15	15	15	15	10	2	2	2	2	2	2
Light Trucks	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total Vehicles	30	71	73	73	69	107	100	100	154	154	172	172	190	190	190	190	190	190	137	137	85	67	48	48
Vehicle Trips[2]/Day	60	142	146	146	178	214	200	200	227	227	344	344	380	380	380	380	380	380	274	274	170	134	96	96
Peak Hour	11	51	51	51	47	88	81	81	135	135	153	153	171	171	171	171	171	171	131	131	79	61	42	42
AM Via Devonshire	7	31	31	31	28	53	49	49	81	81	92	92	103	103	103	103	103	103	79	79	47	37	25	25
Via Washington	4	20	20	20	19	35	32	32	54	54	61	61	68	68	68	68	68	68	52	52	32	24	17	17

PM
All Via Devonshire

[1] # Workers ÷ 1.1

[2] One-way trips.

average). Also shown are estimated daily numbers of heavy and light trucks, by month. The total vehicle trips per day to the site shown in Table 6.3.2 are one-way trips (i.e., one trip in and one trip out equals two one-way trips). The number of peak hour trips assumes all worker trips occur in the morning and afternoon peak hours, two heavy trucks both arrive and depart in each park hour, and that one light truck does so. The estimated directional distribution is also shown.

During months thirteen through eighteen, the greatest number of vehicles will arrive at and depart the site. By applying the directional peak-hour traffic volumes for those months, and adding traffic growth in 1980, the peak-hour volumes, and volume/capacity ratios for the worst-case construction period may be found. These are shown in Table 6.3.3.

It should be noted that the figures in Table 6.3.3 are the worst-case figures because of the following:

1) Very low construction worker auto occupancies are used, thereby maximizing vehicle demand;

2) It is assumed that at the peak time, 165 vehicles will park on-site, even though currently only 75 do so on the commercial lot;

3) It is assumed that all commuting occurs within <u>one</u> peak hour in the morning, and one in the afternoon; and

4) Existing traffic moving to the site will still enter the area, but elsewhere.

Table 6.3.3 shows that even at the busiest period for construction activity, no intersection leg previously experienced capacity constraints except the Congress/Devonshire/State leg already at capacity. While Devonshire at Water has a significant increase in its volume/capacity, this is only temporary, and still only represents volumes slightly over half of capacity.

Table 6.3.3

Traffic Volumes, V/C Ratios, Construction Period (1980)

Approach Leg	Peak Hour Volume	Volume/ Capacity	% Change
Water St @ Devonshire	355	0.41	2.5
Devonshire @ Water	425	0.52	73.3
Washington @ Court/ State	670	0.86	2.4
Court/State @ Washington	1030	0.82	2.5
Congress/Devonshire(NB)@ State	1010	1.17	8.3
Congress/Devonshire(SB)@ State	825	0.40	2.6
State @ Congress	680	0.70	11.1

The "at capacity" leg has an increase in volume/capacity of 8%. Two percent of this is due to general traffic growth. The extra burden from construction activity, while slight, will exacerbate a bad situation. Mitigative measures should be taken here, such as encouraging workers to proceed south on Congress and circle around to approach the site from Washington Street, or to use public transit.

6.3.3 Operational Period

Once the project is complete, vehicle traffic which will be generated will be limited mainly by the garage capacity of 150 spaces. About half of these spaces will be set aside for residents and half for office and retail workers. Both residents and employees will have fairly low turnover rates. For the sake of conservatism, it is expected that during the peak hour, every space will generate either an entering or departing vehicle (residents generally leaving when employees are arriving). It is not assumed that residential spaces are used for high-turnover parking during the day, although the scheme could be used. At any rate, this type of activity would only slightly affect the peak periods, the times which are of most importance.

On the assumption that during the peark period, 75 vehicles will enter the site via either Washington or Devonshire Streets, and 75 will depart via Devonshire, we can see that there will be little effect on the surrounding street network. Table 6.3.4 shows expected 1982 peak-hour volumes and volume/capacity ratios (note that, again, previous traffic to the site is assumed to remain in the area. Also, Table 6.3.4 reflects ten retail customer trips per peak hour, based on standards used by the BRA*).

---

*35 person-trips per 1,000 square feet of space; modal split to auto of 30%; peak period = 13% of ADT. (Lafayette Place EIR, 1968).

By 1982, the projected first year of occupancy, there will not be any capacity problems due to the project. The capacity constraint on Congress Street will remain, but the expected 40 vehicles which can be attributed to the project represent less than 4% of the traffic here. To the extent that congestion will remain a problem at this intersection, little of that problem will be attributable to the project; most will represent an ongoing problem, albeit a minor one.

6.3.4 Summary

Traffic volumes during construction and operation of the Devonshire Towers will not be the source of any major traffic congestion. The limited size of the parking garage, the type of use for which the site will be used, and the convenient location, all mitigate the chance of it being a major generator of vehicle trips. While some peak-hour congestion inevitably exists in this downtown location, the project will not add to this problem in any significant way.

6.4 Air Quality

Development of a building such as Devonshire Towers creates two major means for degrading air quality. First, the building may be a "point source" of air pollution emissions. Boilers and other combustion equipment in the building may add to local emissions by burning fuels on site and releasing combustion gases to the air. Second, the building may be an "indirect source". An indirect source is facility or activity which attracts motor vehicles which generate carbon monoxide (CO) emissions.

6.4.1 Point Source Emissions

The building's heat and hot water will be generated by an 8,500,000 Btu/hour boiler. The boiler will be a dual capacity gas or oil burner. The developer plans to use

Table 6.3.4

Traffic Volumes, V/C Ratios, 1982

Approach Leg	Peak Hour Volume	Volume/Capacity
Water St. @ Devonshire	365	0.42
Devonshire @ Water	340	0.42
Washington @ State/Court	685	0.88
State/Court @ Washington	1050	0.84
Congress/Devonshire (SB) @ State	1020	1.18
Congress (NB) @ State	840	0.41
State @ Congress	685	0.71

natural gas to fire the system. Boston Gas has confirmed the availability of the 16,000 MCF of gas required each year.

Table 6.4.1 is a simple calculation of annual emissions associated with the operation of the heating boiler. Resultant annual emissions are inconsequential. As shown in the table, nitrogen oxides are the pollutant for which highest emissions are predicted. Even during peak loading emissions of nitrogen dioxide will be less than one pound per hour.* Emissions at this rate present no potential for air quality problems.

6.4.2 Indirect Source Emissions

The development of Devonshire Towers may affect local CO concentrations in two ways. First, the new building will affect the traffic generation characteristics of the site. The existing parking lot and its capacity to accommodate 75 cars will be removed. In its place, the building will garage approximately twice as many cars. The increased parking capacity will result in modest increases in local traffic. The increases in traffic will result in higher local emissions of CO. At the same time, however, the Federal Motor Vehicle Emissions Control Program (FMVECP) will have a dramatic impact on reducing the exaust emission rates for all motor vehicles. Each year, in the near term, the composite mix of vehicles will decrease in average unit emissions per vehicle.

Secondly, the development of Devonshire Towers will modify the urban landscape. A street canyon will be created on either side of the new building. The street canyon is significant, since it tends to trap the CO emissions and create "hot spots" in which CO concentrations are elevated.

In order to estimate the net changes in potential indirect source impacts, two adverse case scenarios have

---

*8,500,000 Btu/hr ÷ 1,050 Btu/ft. X 120 $^{\#NO}$x/1,000 ft.^{3} = .97 lbs.

Table 6.4.1

Annual Air Pollution Emmissions From Natural Gas Heating

		lb/MCF[1]	Annual Use (MCF)	Annual Emmissions (lbs)
1	Particulates	.019	$1.6x10^4$	304
2	Sulfer oxides	0	$1.6x10^4$	0
3	Carbon Monoxide	.020	$1.6x10^4$	320
4	Hydrocarbons	.008	$1.6x10^4$	128
5	Nitrogen Oxides	.120	$1.6x10^4$	1920

1 Source: AP-42 table 1.4-1

been compiled. "Before and after" cases have been compiled for sensitive receptors along Washington Street. Simplified air quality calculations have been undertaken to approximate CO concentrations for each of these cases. The first scenario is the "existing adverse case", prior to the building project. The scenario is graphically depicted in Figure 6.4.1. In this case (1979), it is assumed that rush-hour automobile traffic maintains a queue three lanes wide for a length of 150 meters for the entire hour. During the entire hour, idling emissions are released by the automobiles. The dispersion of the emissions was calculated using the EPA Volume #9 Indirect Source Guidelines (see Appendix D for dispersion parameter, meteorological conditions, and emissions rates used). Resulting concentrations were calculated for pedestrian receptor locations approximately nine meters from the center of the roadway. Such receptor locations are representative of the plaza area at One Boston Place and the adjacent building facades and sidewalks. Under these adverse case conditons, the traffic on Washington Street will contribute about 18 parts per million (ppm) to peak-hour CO concentrations. Assuming a background CO concentration of 7 ppm,* due to naturally occurrng levels of CO, and other remote traffic; the total ambient levels of CO in the existing case would be approximately 25 ppm. While this is a reasonably high CO concentration, it is well within the National Ambient Air Quality Standard of 35 ppm of CO for one hour.

In the second scenario, it was assumed that Devonshire Towers would be completed. The completion of the building will create a street canyon in which dispersion of the CO is inhibited. Once again, the adverse situation of queued traffic is assumed. Three lanes of vehicles are assumed to operate in an idling mode over a 150-meter queue length for an entire hour. This situation is graphically depicted in Figure 6.4.2. For this scenario, the dispersion of emissions

*Source: Lafayette Place Final Environmental Impact Statement, November, 1978.

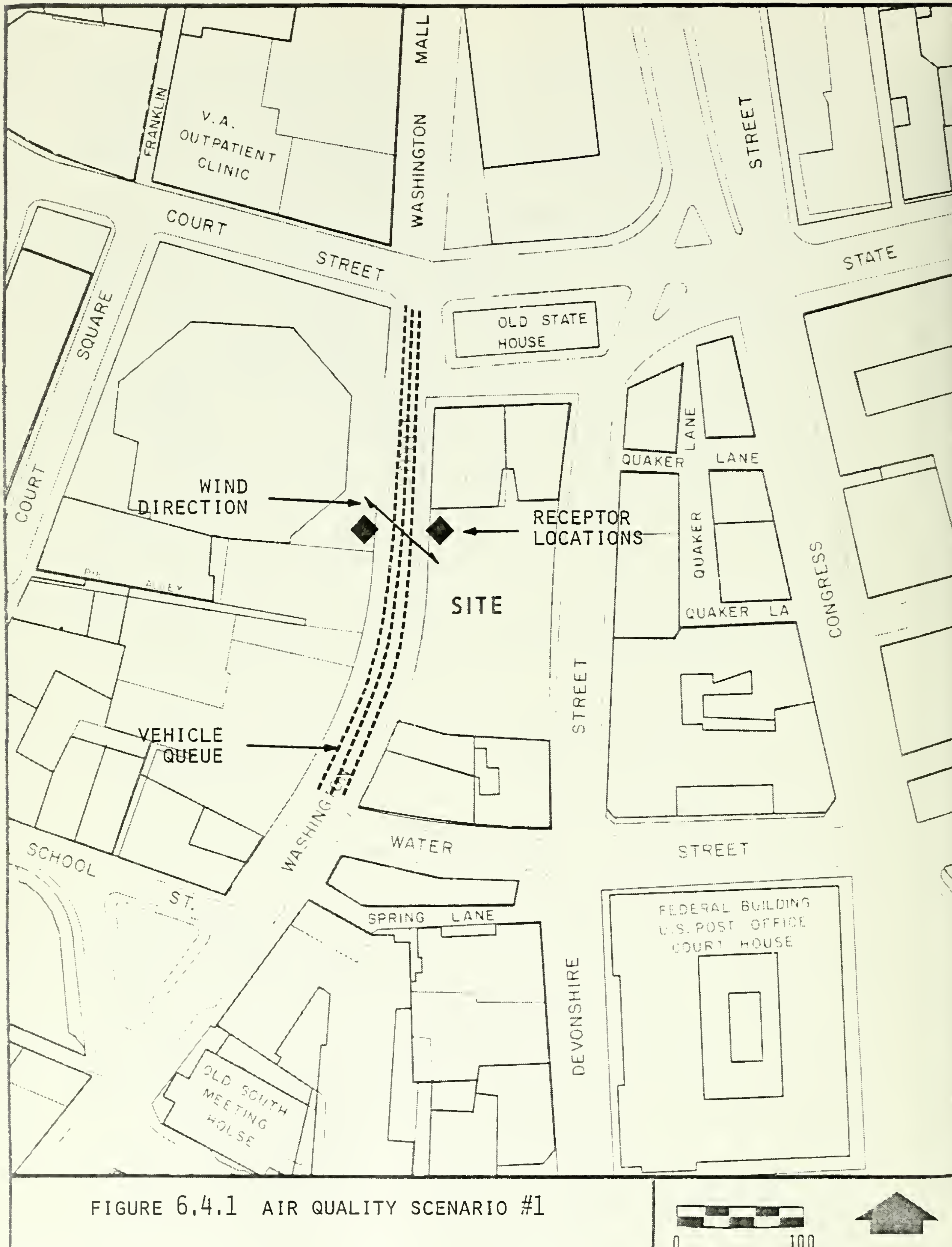


FIGURE 6.4.1 AIR QUALITY SCENARIO #1

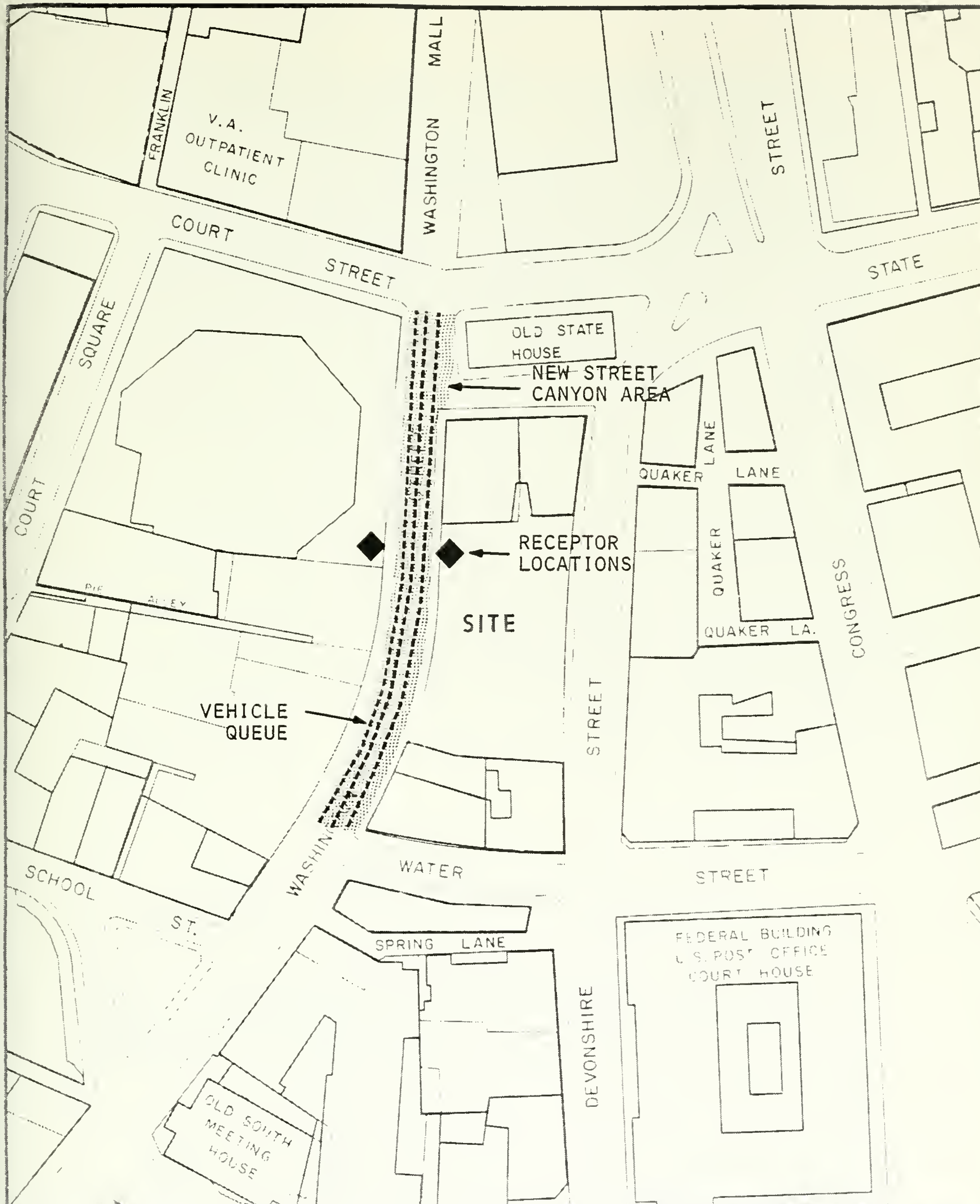


FIGURE 6.4.2 AIR QUALITY SCENARIO #2

was approximated using the Street Canyon Model described in Appendix C of the Volume #9 Indirect Source Guidelines (Appendix D of the EIR outlines the dispersion parameters, meteorological conditions and emissions rates incorporated in Scenario #2). The resulting CO concentrations were calcualted for the same receptor locations identified in Scenario #1. Under these street canyon assumptions, the traffic on Washington Street will contribute about 19.5 ppm to peak-hour CO concentrations in 1982, when the building is completed. Assuming a 1982 background of 5 ppm*, the total ambient levels of CO for Scenario #2 would be approximately 24.5 ppm.

Limited conclusions may be derived from the comparison of CO levels associated with the before and after adverse case peak-hour scenarios. It appears that there will be little net change in the adverse cases analyzed. Reductions in local emissions will be roughly offset by the changes in dispersion characteristics. In each case, peak-hour CO levels are high, as one might expect in a Central Business District (CBD) setting.

In neither case, however, is an exceedence of the 1-hour CO standard anticipated.

6.5 Noise

6.5.1 General Characteristics of Community Noise

The noise environment of a typical urban community contains a nearly steady "background" noise resulting from industrial noise, commercial activity, heating and air conditioning equipment, other continuously operating machinery, and the multitude of motor vehicles throughout the city. Superimposed on the background is the noise from nearby cars, trucks, trains, planes, and noise from the general activity of people. Table 6.5.1 identifies noise levels associated with some common activities and sources of noise.

---

*Source: Lafayette Place Final EIR.

TABLE 6.5.1

COMMON NOISE LEVELS[1]

Sound Level (dBA)	Associated Activity
130	Threshold of Pain
120	Chipping on Metal
110	Rock Band
100	Jack Hammer
	Jet Take-off (1/2 mile)
90	Threshold of Hearing Damage
80	Shop in Shipyards
	Busy Freeway
70	Downtown Traffic
	Electric Typewriter
60	Normal Conversation
	Urban Residential Area (Nearby Traffic)
50	Drafting Office
40	Suburban Neighborhood (Distant Traffic)
	Private Office
30	
20	Quiet Rural Area (No Traffic)
10	
0	Threshold of Audibility

[1]Adapted from Acoustical Seminar, Robin M. Towne & Associates, 1971. (These values are approximate, and do not reflect specific situations described in this report.)

When assessing the impact of noise on people, background levels, noise peaks, and the fluctuation of the noise levels are generally considered. Non-steady noise exposures in the community are commonly expressed in terms of an A-weighted sound level (dBA) that is exceeded for a percentage of the measured time period. The term "L_x" is used to describe the sound level value that is exceeded for x percent of the time period under consideration. Following are some of the commonly used "percentile levels":

L_{10} = The noise level (dBA) that is exceeded 10% of the time. L_{10} of 70 dBA due to peak-hour traffic noise is the maximum design level criteria for residentially zoned areas (including hospitals) used in the Federal Highway Administration noise standards.

L_{33} = The noise level exceeded 33% of the time. The HUD Circular 1390.2 refers to the maximum external noise levels at a housing site that are exceeded for 33% of the day (8 hours out of a 24-hour weekday period).

L_{50} = The median noise level value. Half of the observed measurements exceed L_{50} during a given sampling period.

L_{90} = The noise level that is exceeded 90% of the time. L_{90} is used as a measure of background noise.

Another method of quantifying the noise environment is to determine the value of steady-state sound which has the same A-weighted sound energy as that contained in the time varying sound. This is termed the Equivalent Sound Level (L_{eq}). The L_{eq} is a single value of sound level for any desired duration, which includes all of the time-varying sound energy in the measurement period. The major virtue of the L_{eq} is that it correlates reasonably well with the

effect of noise on people, even for wide variations in environmental sound levels and time patterns. It is used when only the durations and levels of sound, and not their times of occurrence (day or night), are relevant. EPA feels that L_{eq} is a better measure of "exposure" to noise.

6.5.2 Existing Noise Levels at the Site

Noise levels at the site have been estimated based on a single spot check noise measurement program. Noise levels were monitored from the portion of the site adjacent to the Washington Street sidewalk at the parking lot entrance. The values were measured on a weekday during mid-afternoon when there was plenty of local urban activity. The measured noise levels are outlined in Table 6.5.2. In addition, the table compares the observed noise levels to noise levels measured at other sites in the downtown area.

The values in the table show that the existing noise levels at the Devonshire Towers site are typical of those for urban sites in Boston. Both the L_{90} at 62 dBA, and the L_{eq} at 67.5 dBA are in the middle of the range of values measured at the nine sites in Boston.

The recorded L_{33} for the site was 67 dBA. This recording was representative of the business hours of the day. Therefore, it is very likely that the L_{33} for 24 hours is substantially lower, perhaps less than 60 dBA. According to HUD Circular 1390.2, a site in which the 24-hour L_{33} is less than 65 dBA is considered "normally acceptable" as a site for new housing construction.

6.5.3 Construction Phase Noise Levels

There are two particular times during the construction of Devonshire Towers when the use of heavy duty construction equipment is relatively intensive. It is during these periods of intensive use of the heavy-duty equipment that potential for noise impacts in greatest. The first period

Table 6.5.2

Comparison Of Observed Noise Levels In Downtown Boston

	L_{90}	L_{50}	L_{33}	L_{10}	L_{eq}
Devonshire Towers	62	66	67	73	67½
25 Eliot St.	66	—	—	—	78
Boston Common	53	—	—	—	60
32-36 Pinkney St.	55	—	—	—	65
29 Beach St.	63	—	—	—	70
48 Temple Pl.	65	—	—	—	71
Somerset St.	65	—	—	—	66
9 East St.	61	—	—	—	69
75 Federal St.	62	—	—	—	66

Sources: HMM Field Measurements 1979
Boston Air Pollution Control Commission 1975

of peak noise levels is early in the construction period. From the second through the fourth month, the (Phase 1) excavation activity and the (Phase 2) foundation work will take place concurrently. A scenario depicting the combinations of equipment to be operated during this period is described in Appendix E. A total of seven pieces of equipment have been assumed to operate at a theoretical construction site center. Under these conditions, the resultant peak hourly L_{eq} should be approximately 84-85 dBA along the sidewalks bounding the site. The peak hourly L_{eq} at the facades of the buildings across Washington Street and Devonshire Street from the site should be 78-79 dBA. At distances of 100 yards or more from the site, the peak hourly L_{eq} values should be less than 70 dBA.

Figure 6.5.1 is an illustrative representation of the outdoor areas which may be subject to increased noise levels during peak times. The figure is unrealistic in that no attenuation is assumed due to intervening barriers. As a result, the representation "over-predicts" noise levels in Quaker Lane and State Street, and in other areas which do not have a direct line of sight to the construction activity.

The second period of peak construction activity takes place during the pouring of the concrete mat foundation. It is during this period that the peak heavy truck usage takes place. A fairly steady flow of concrete trucks will occur. As many as six trucks per hour may bring the concrete to the site over the course of four consecutive days. The scenario assumed is outlined in Appendix E. During this second period of intense activity, noise levels will be about 1 dBA less than those expected during the excavation period. In short, peak hourly L_{eq} should be approximately 77-78 dBA at the adjacent building facades during the foundation pouring activity.

In each of the two peak noise level scenarios, the predicted noise levels are quite modest. Maximum increases above the existing noise levels are about 10 dBA. The ability

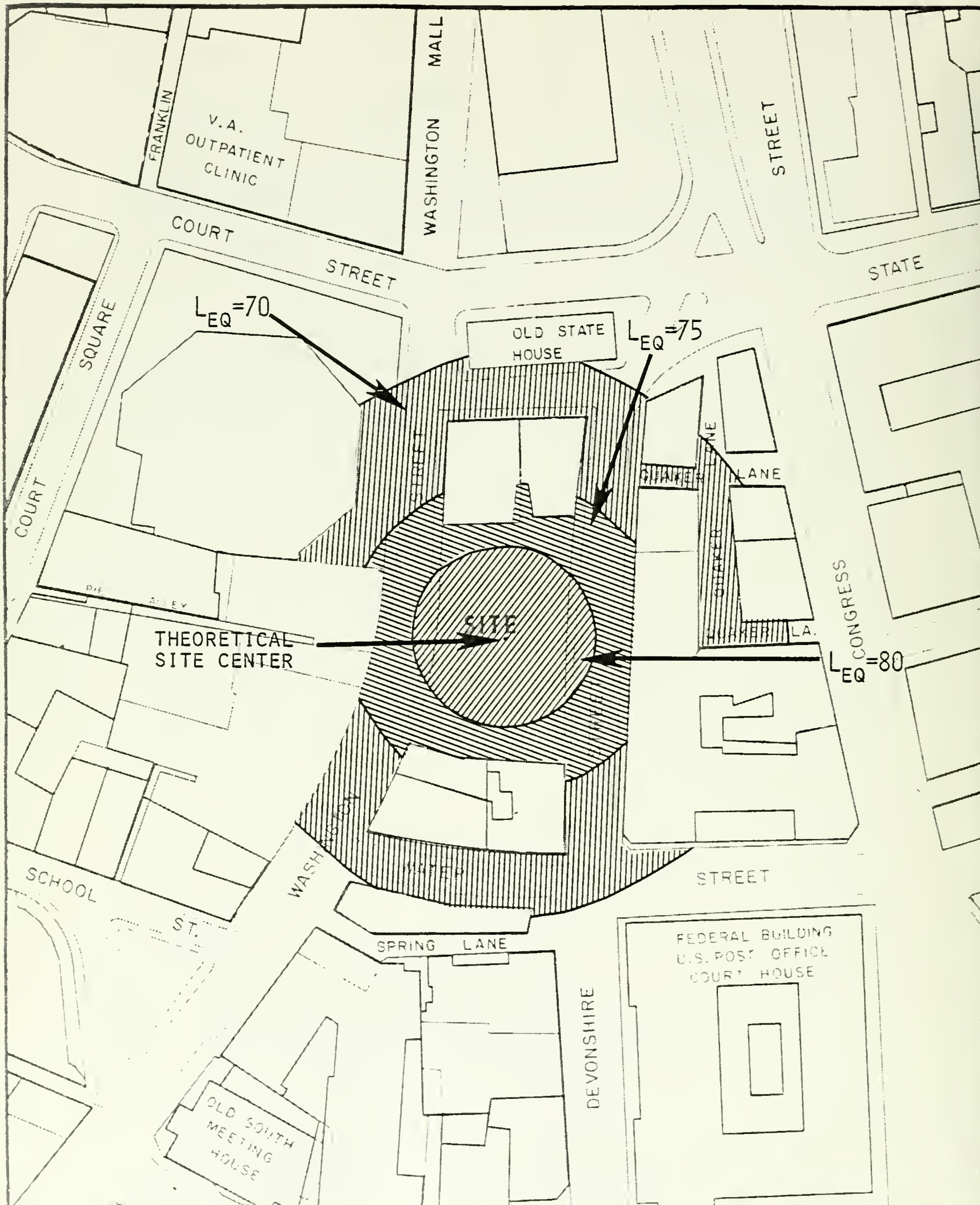


FIGURE 6.5.1 THEORETICAL EXPOSURE DURING PEAK CONSTRUCTION-FREE-FIELD ISOPLETHS L_{EQ}=80,75,70

to prevent large increases in noise levels is attributable to avoidance of particularly noisy construction technologies, such as pile driving. In addition, the limited size of the site (one-half an acre) makes it impractical to use very many pieces of heavy equipment simultaneously.

6.5.4 Operational Noise Levels

Following completion of construction, noise levels will return to levels close to those that exist now. The building will add some mechanical noises associated with its HVAC systems. Some additional traffic may be added as well. Each of these factors will tend to increase noise levels slightly. On the other hand, the existing open parking lot will be eliminated as a noise source, and the building itself will provide an acoustical barrier between Washington Street and Devonshire Street. These trade-offs should result in little net change in noise levels.

6.6 Design and Massing Considerations

The building is designed to reflect and reiterate the scale and function of the surrounding buildings at the streetscape level. In addition, the building has been designed to provide a successful transition from the street level to its tower portion and the skyline. By providing retail space at the two street levels, the architect has maintained continuity with the existing shopping functions on both Washington and Devonshire Streets.

The five levels of office space above the retail activity serve several purposes. First, the space helps meet current demands for prime office space. Second, this space serves as a transition zone from the ground-level retail activity to the privacy of the residential space above. Third, the five levels lift the domestic activity above the noise and activity at street level and into an area of sun and extensive clear views out over the city.

The massing of the building steps from a broader plinth, or base, which relates to the existing streetscape, to a double-winged tower of apartment floors. The tower is parallel to Washington Street as it approaches City Hall, and to the other high rises in the immediate area. The deisgn and massing concepts are visually depicted in Figure 6.1.1.

The facade of the building will be comprised of a flush rear fastened panel of either metal or porcelain enamel. The color of these panels has not yet been selected. The architect is currently studying the various combinations which would be compatible with existing materials at abutting sites.

Significant landscape improvements are planned for the pedestrian level. A new public palza will be constructed at the northwest corner of the site, adjacent to Washington Street. The plaza will connect to a double-height pedestrian passageway from the Washington Street plaza to Devonshire Street. The passageway will be stepped down from Washington Street to Devonshire Street. It will include terraced planters, lighting, and trees.

Roof balconies, accessible to office occupants, will be incorporated on both the Washington and Devonshire sides of the building. In addition, there will be large roof decks at the mechanical level serving the laundry and community spaces for the apartment occupants. The roof-top health club will incorporate sun decks and a swimming pool.

6.7 Solid Waste

There are three major activities that will contribute to solid waste volumes generated in Devonshire Towers. The first is domestic solid wastes from the apartments. A total of 2,688 pounds per day is expected from this source. The second waste-generating activity is the 100,000 square feet of office space, which will generate about 1,000 pounds per day. The third component will be the 8,000 square feet of

retail space which will account for 320 pounds per day of solid waste. In total, approximately 4,000 pounds, or two tons per day of solid waste is expected.

Wastes from each floor will be transported via intregal trash chute to the trash compactor in the basement of the building. The waste volumes will be compacted to a density of about 400 pounds per cubic yard. The resultant waste volume of 10 cubic yards per day will result in the need for two waste disposal truck trips per week to service the building.

The waste will be removed by private contractors. The major contractors serving the city generally remove the domestic wastes to remote landfill sites in various parts of Massachusetts. The landfill areas in Amesbury and Plainville, for example, are likely disposal sites for the Devonshire Towers wastes.

Assumptions and calculations used in estimating solid waste numbers are attached in Appendix F.

6.8 Energy Usage

The operation of Devonshire Towers will require the consumption of energy for a large number of activities. The present plans call for the use of both electricity and natural gas. The electricity will be supplied by Boston Edison and the natural gas by Boston Gas.

6.8.1 Electrical Energy Consumption

A summary of electrical power consumption estimates is provided in Table 6.8.1. A total peak demand of slightly more than 4,200 Kw is expected. The two major contributors to this total are the HVAC systems at 1,665 Kw, and the residential apartment units at 1,140 Kw. The HVAC load includes the air conditioning plant, vent fans, air handlers, and fan coils. The residential demand is comprised of lighting, small appliances, and dishwashers. Boston Edison

has confirmed that it can meet this level of demand. These usage figures are based upon using modern energy systems throughout the building.

6.8.2 Gas Consumption

Natural gas will be used for space heating, cooking, and hot water. Rough estimates are that 16,000,000 cubic feet of gas per will be required for this purpose. Boston Gas has indicated that this is available for allocation to Devonshire Towers. The project will be connected to the Boston Gas system via the pipe in Street.

6.9 Water and Sewer Needs

Four components of the space in Devonshire Towers generate water supply demands. The largest demand by far is created by the apartments. A total demand of 115,200 GPD is created by the apartment dwellers. The offices create a demand for 8,000 GPD of water, assuming a work force of approximately 800. The health club portion of the tower is estimated to require 5,000 GPD of water. Lastly, the retail space and garage will require the use of another 1,000 GPD. Total water demand is, therefore, almost 130,000 GPD.

It has not yet been determined which sewer main will service Devonshire Towers. It will most likely be the 24 inch main in Washington Street, or a combination of the 16 inch and 12 inch mains in Devonshire Street. Water will be provided through the 16 inch main in Washington Street and the 12 inch main in Devonshire Street.

The engineer for the project has spoken with officials and indicates that there is sufficient capacity to meet the water and sewer needs of the project. No new facilities will be required as a result of the development of Devonshire Towers.

The waste water will eventually be treated at the Deer Island Sanitary Sewerage Treatment Plant. The waste from Devonshire Towers will not tax this facility.

7. MEASURES TO MINIMIZE ENVIRONMENTAL DAMAGE

Decisions made by the developer and the design of Devonshire Towers incorporate several features which minimize the potential for adverse impacts. The following measures are the most noteworthy of the mitigation items:

- The site has previously received preliminary approval for development as an office building. The terms of the approval allowed development at a much greater mass. The current design reduces the cross-sectional area of the building planned. The reduced mass results in reduced potential for wind, shadow, and visual quality impacts. The setback of the building, at the residential levels, and the irregular cross-section help in this regard.
- The Devonshire Towers design incorporates the two-level pedestrian passageway and an attached plaza. The design element includes extensive landscaping and walkway enhancement. The passageway assures the continuance of through-public access between the two streets. It also enhances the visual quality of the immediate area. The small public open space is an attractive amenity for the densely developed area.
- The project includes outstanding vehicular access design. Loading areas for both passenger cars and trucks are provided in the interior of the site. As a result, passenger pickup and deliveries will not impede through-traffic on either adjacent street.
- Trash systems have been designed to minimize service problems. Trash is collected through chutes which transfer wastes to the compactor. The compactor is a pneumatic cart type. This means

that trash is collected twice a week by special contractor rather than by the city. Handling trash in this manner means that costs are covered by the developer and that the visual impact of curbside waste storage and pickup is avoided.

- The shape of the building has been designed to minimize its intrusion. The retail and commercial space has been planned at a scale consistent with abutting buildings. The residential tower has been stepped back both for its own protection and to minimize the visual intrusion on abutting mid-rise structures.

At this time, the project proponent is aware of no other areas in which mitigating measures are warranted. No requests for other measures to minimize perceived potential for environmental damage have been received.

APPENDICES

Solid waste is collected twice a week by special contractors rather than by the City. Handling trash in this manner means that costs are covered by the developer and that the visual impact of curbside trash storage and pickup is avoided.

* The shape of the building has been designed to mitigate the intrusion. The retail and commercial space has been designed at a scale consistent with abutting buildings. The residential tower has been stepped back both for its own protection and to minimize the visual intrusion on abutting mid-rise structures.

In this sense, the project generates an [illegible] of no other areas in which mitigating measures are required. No requests for other measures to minimize potential environmental impacts have been received.

APPENDICES

Appendix Material

Appendix A	Wind
Appendix B	Historic
Appendix C	Traffic
Appendix D	Air Quality
Appendix E	Noise
Appendix F	Solid Waste
Appendix G	Energy

Appendix A

WIND

WIND & TALL BUILDINGS.

SOME ILLUSTRATIONS

T. I. McLaren, Ph.D.
Senior Consultant

Atmospheric Wind Effects

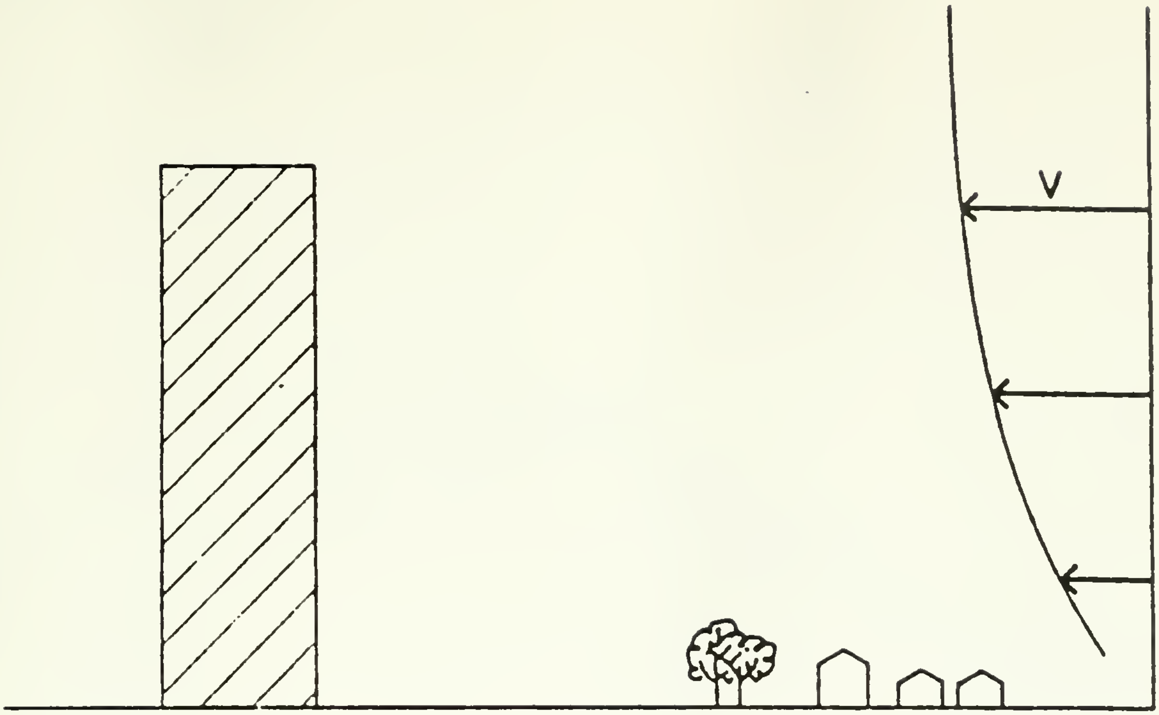


Figure 1 (a) The natural wind velocity profile. Topographical features such as buildings, trees, hills, etc. affect the shape of the velocity profile.

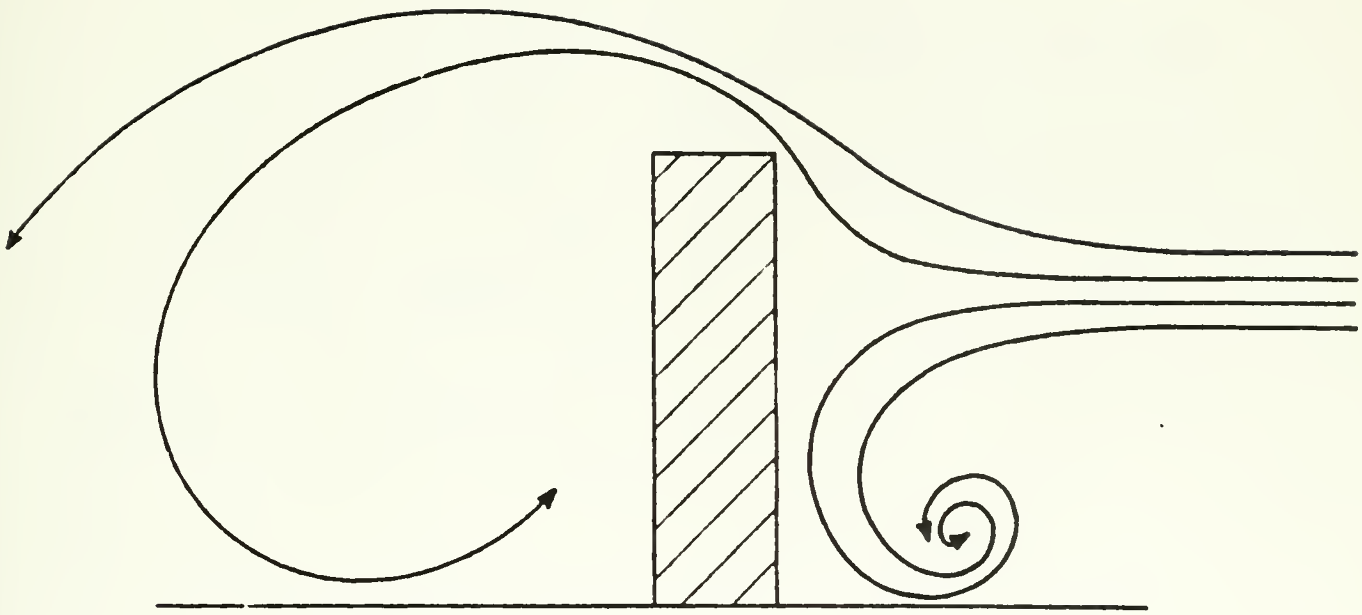


Figure 1 (b) Typical air flow pattern in front of wide building.

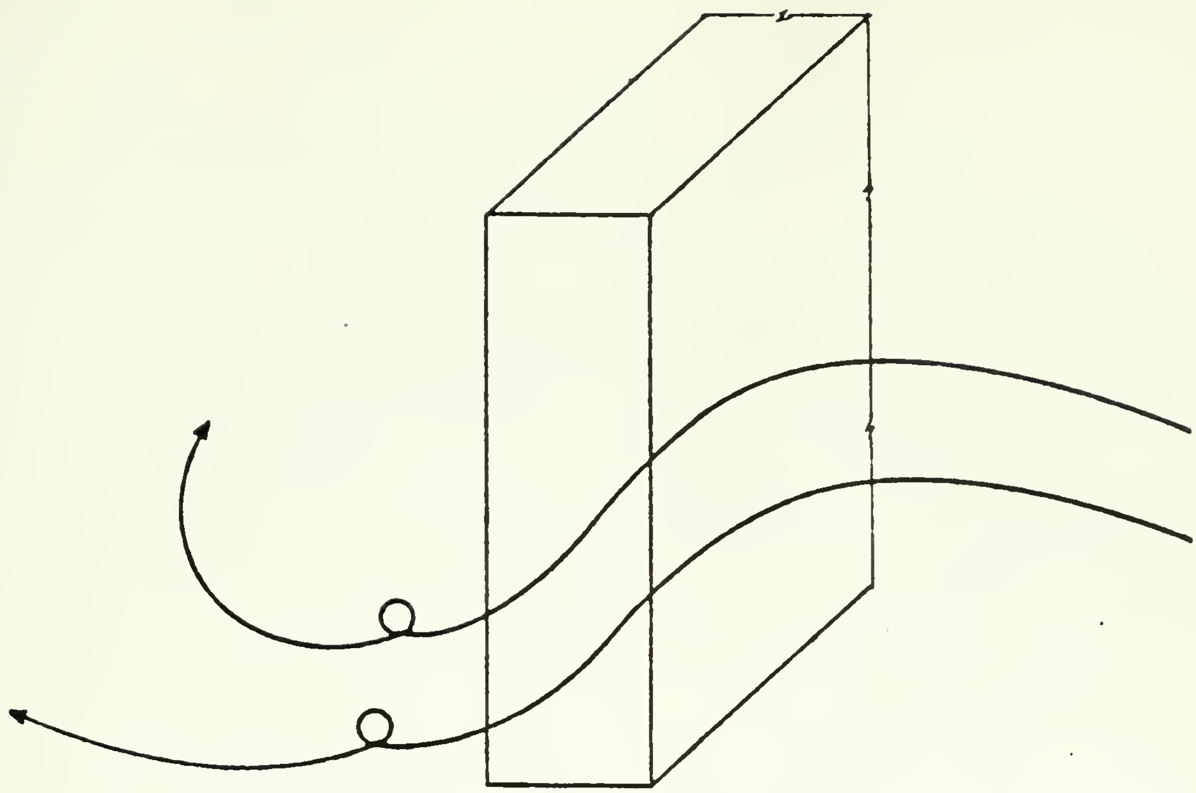


Figure 1 (c) Illustration of air flow near a corner of a building.

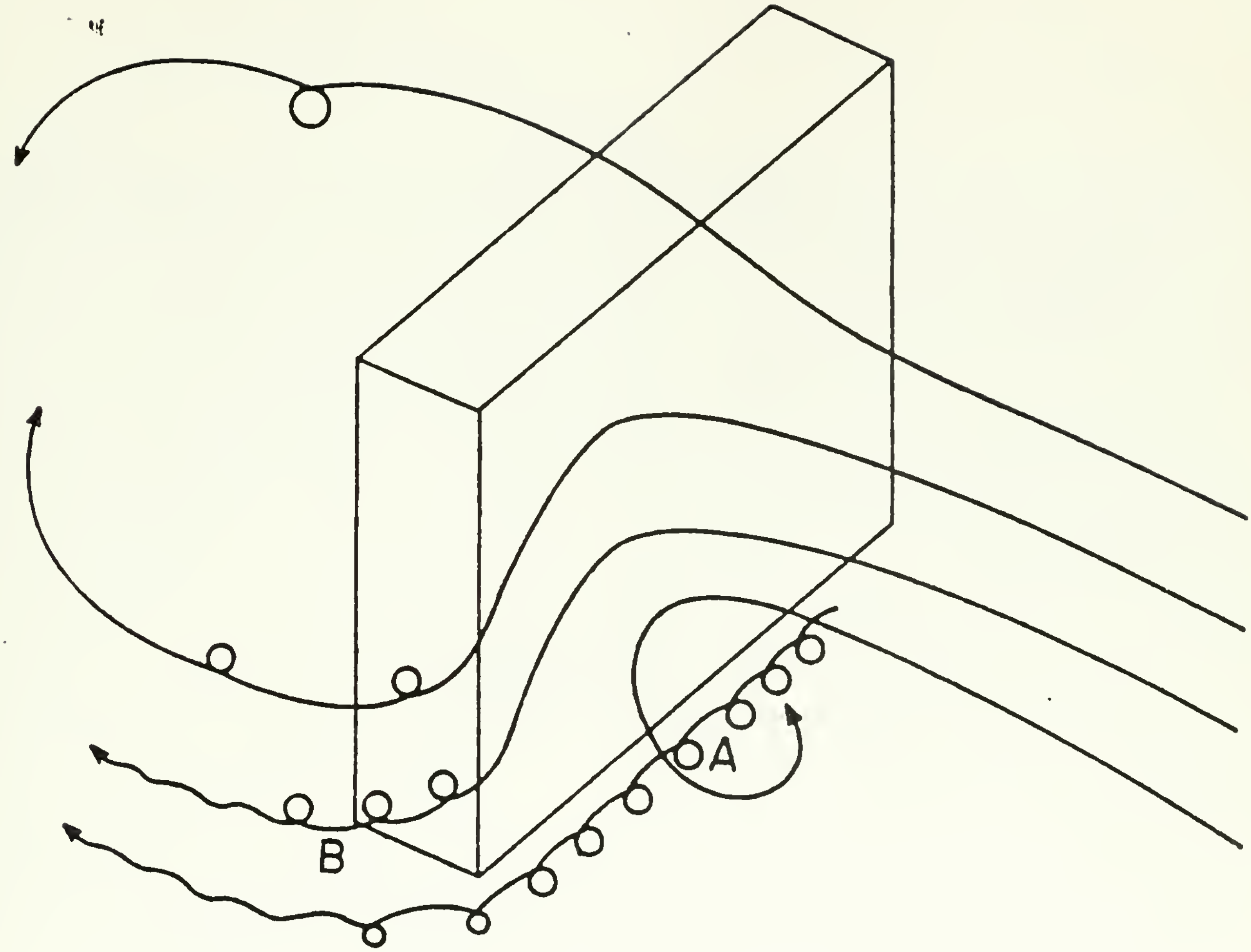


Figure 2 (a) Air flow patterns associated with a wide building.

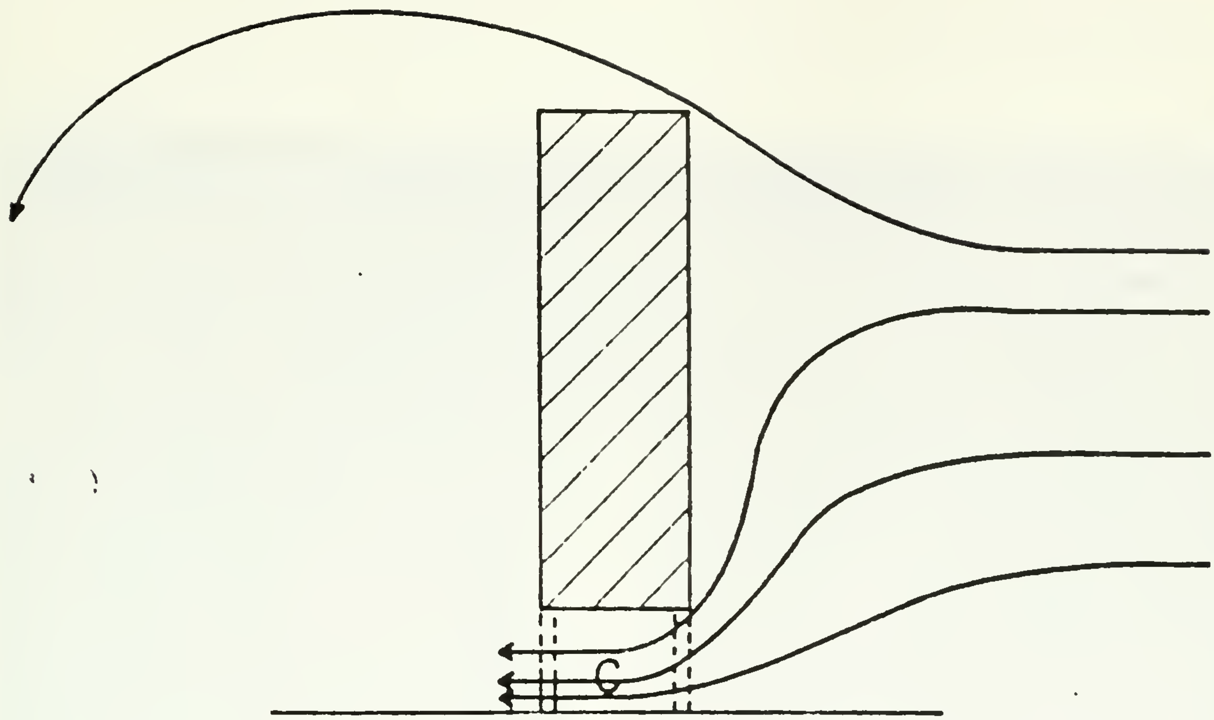


Figure 2 (b) Air flow pattern at building with a underpass.

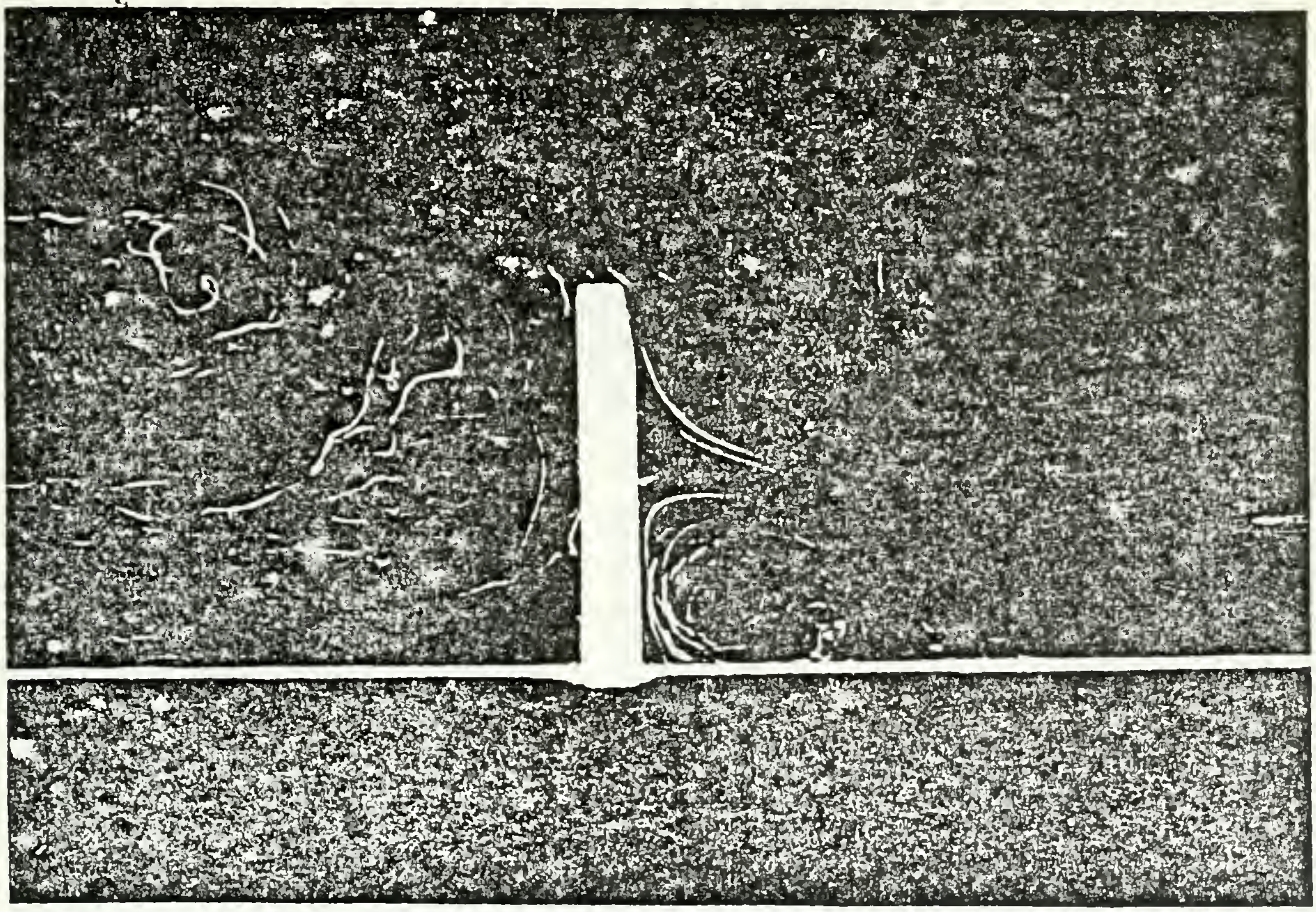


Figure 3 (a) The picture shows a rectangular block model (Height:Width = 0.7) in the BBN wind tunnel. The air flow is from right to left, the white streaks show the paths of the helium filled soap bubbles which follow the air flow. Note how the air is deflected downward in front of the building from a point (in this case) about one-half the building height. It forms a standing vortex pattern in front of the building which is characterized by a relatively high speed circulating air flow.

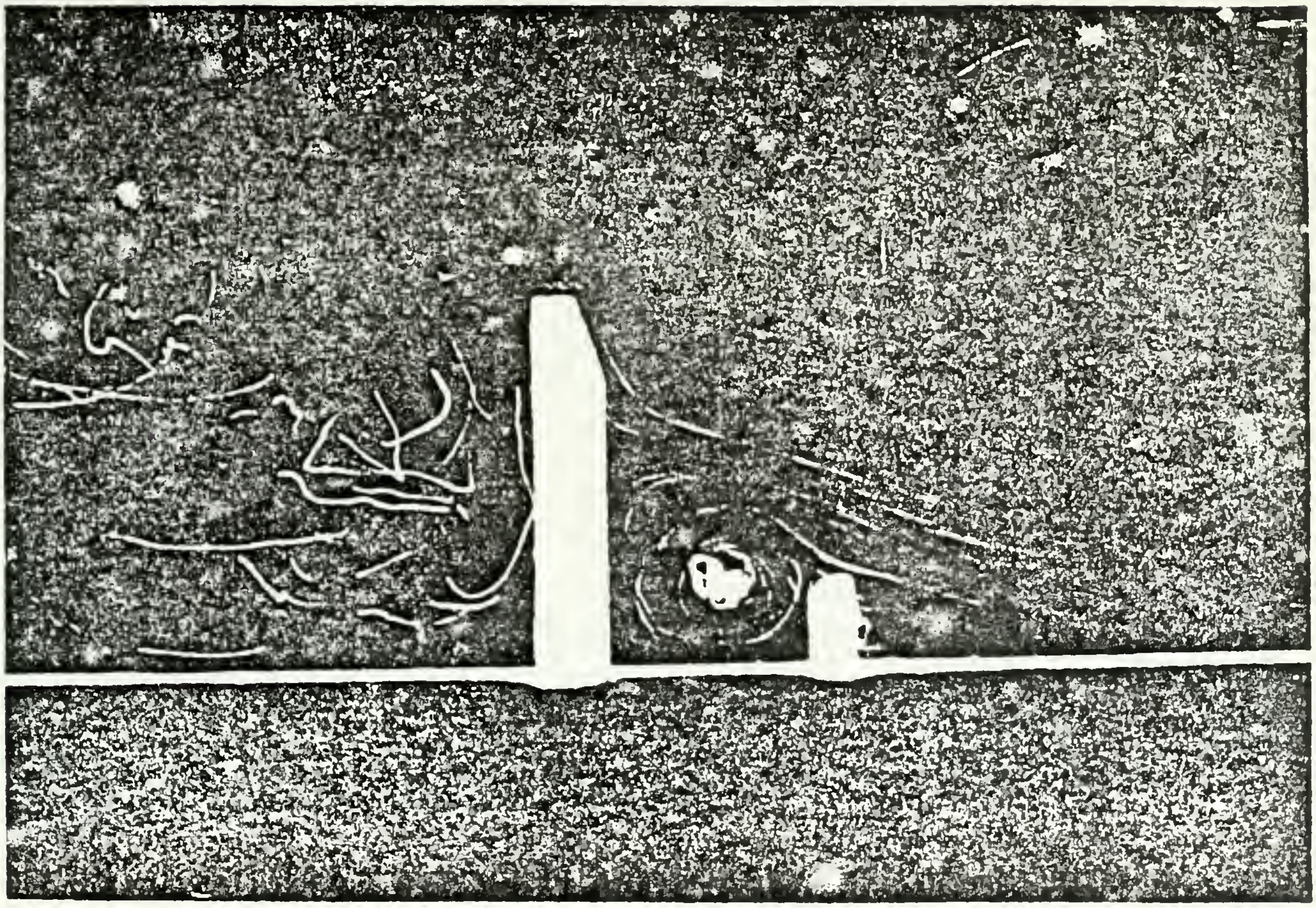


Figure 3 (b) A smaller building has been added upwind of the building modeled in Figure 3 (a). Note how the vortex is trapped in the region between the buildings, aggravating the problem illustrated in Figure 3 (a).

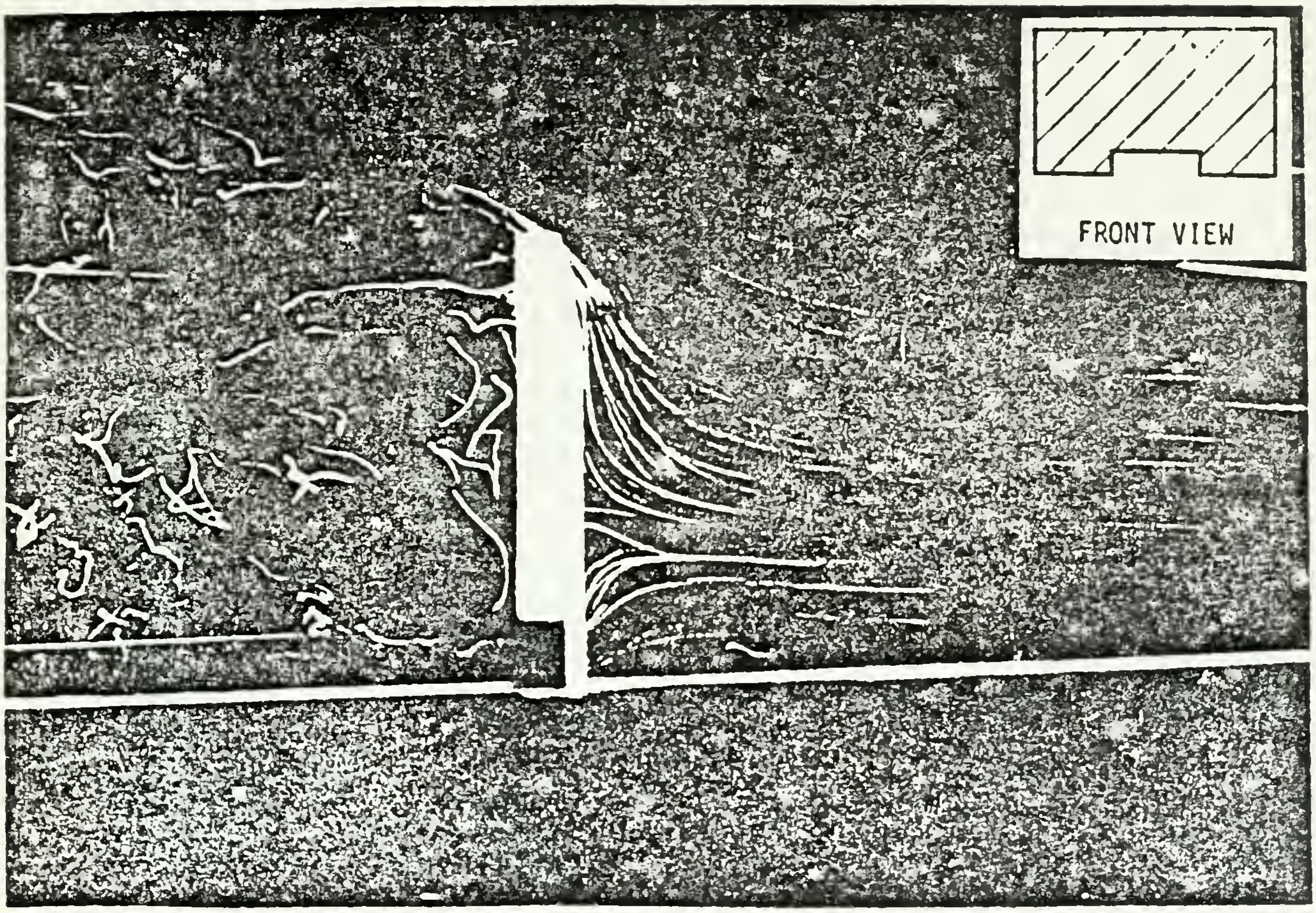


Figure 3 (c) The building model is here elevated on two side pillars. The vortex has been removed from in front of the building, but the underpass can now act as a natural wind tunnel with an acceleration factor up to three.

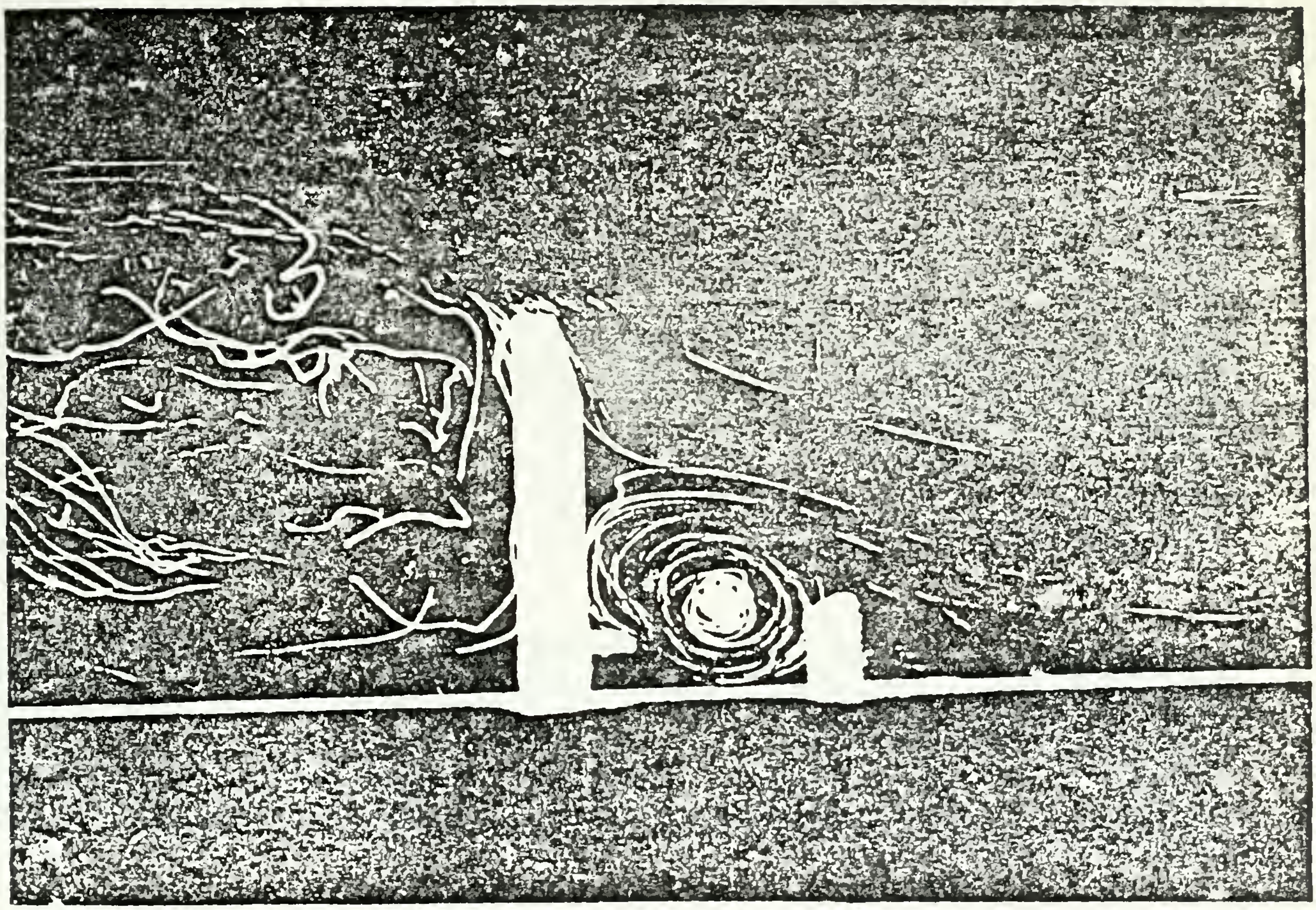


Figure 3 (d) Shows how a properly dimensioned canopy can provide shelter for pedestrians close to the base of a building.

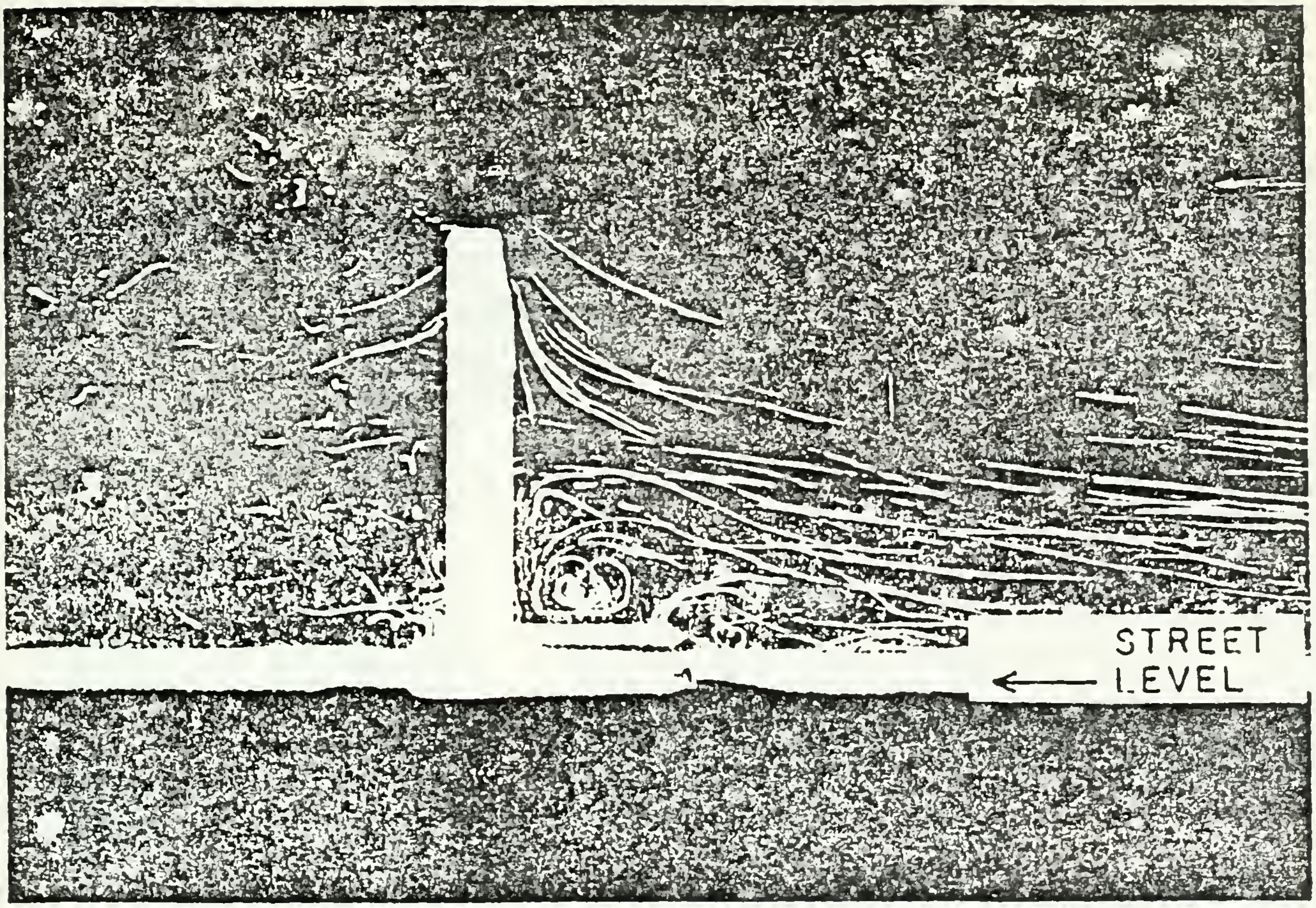


Figure 3 (e) Shows how the location of a building on a podium can allow pedestrian activity at street level to be unaffected by the downward wind flow caused by the building.

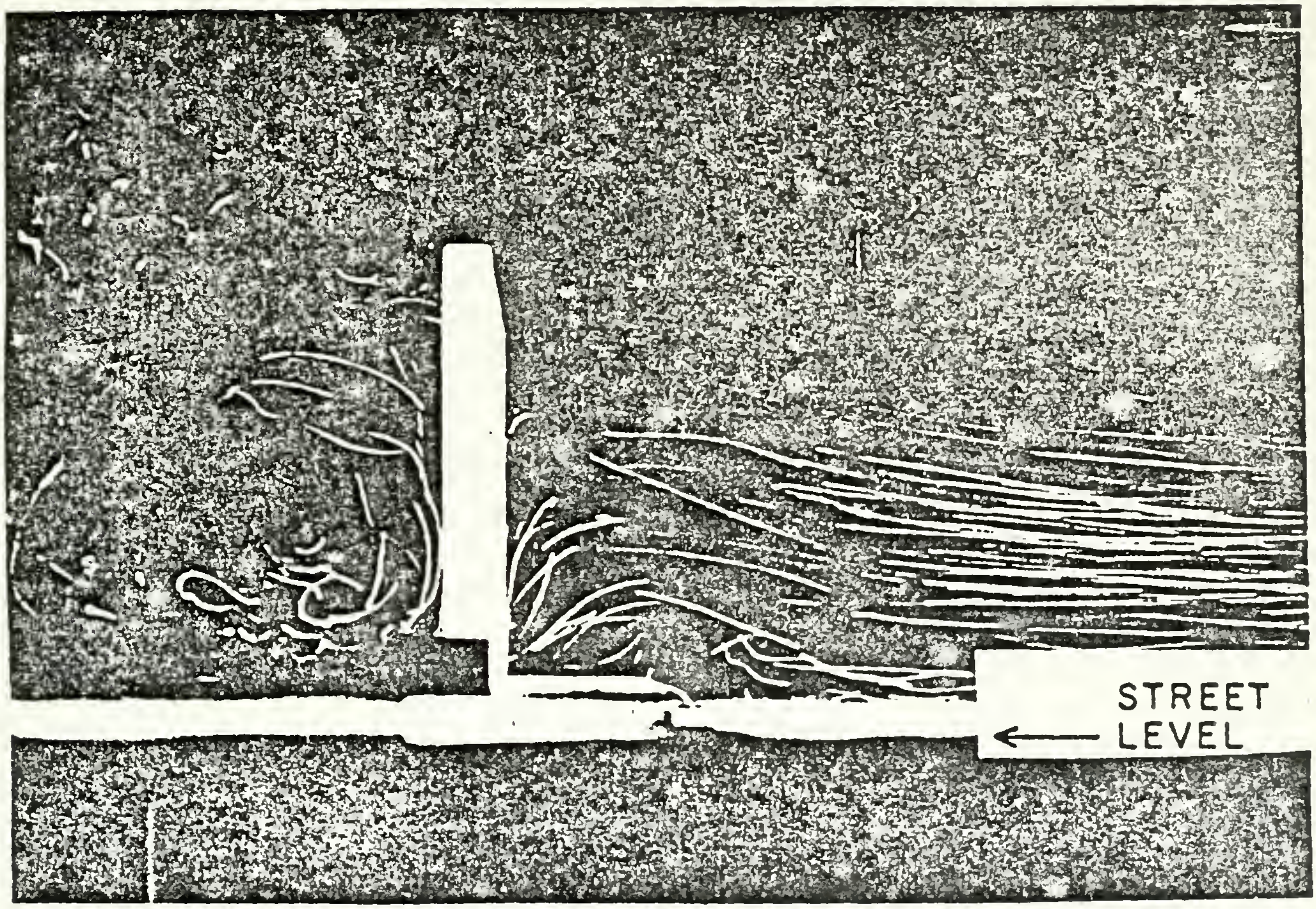
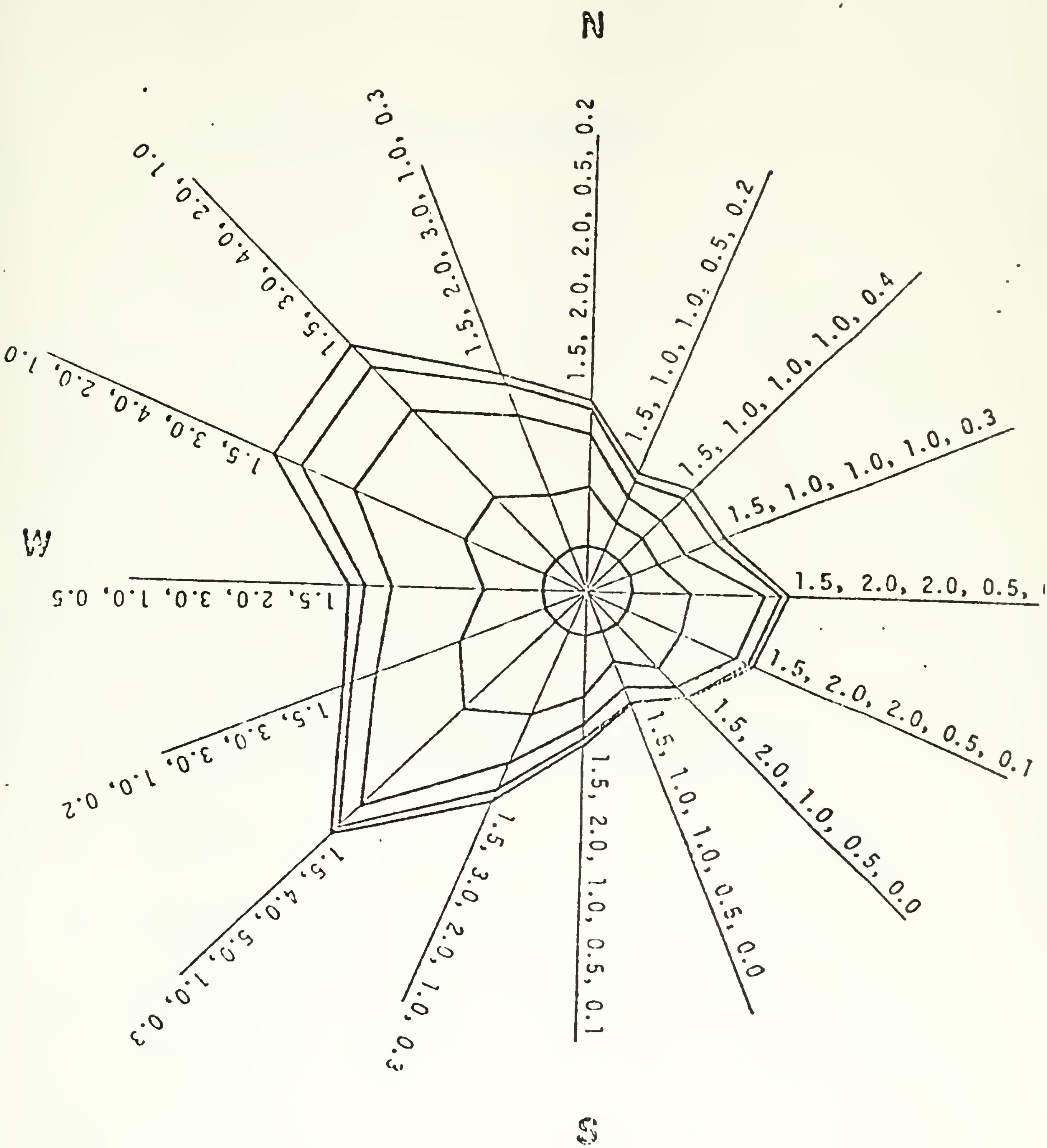


Figure 3 (f) Shows the utilization of an underpass to relieve wind activity on the windward side of a podium. This can permit the use of a smaller podium than for Figure 3 (e). Again pedestrians at street level on the upward side are largely unaffected by the wind flows on top of the podium.

WIND ROSE FOR BOSTON, MASSACHUSETTS


N
1.5, 2.0, 2.0, 0.5, 0.2
1.5, 1.0, 1.0, 0.5, 0.2
1.5, 1.0, 1.0, 1.0, 0.4
1.5, 1.0, 1.0, 1.0, 0.3
1.5, 2.0, 2.0, 0.5,
1.5, 2.0, 2.0, 0.5, 0.1
1.5, 2.0, 1.0, 0.5, 0.0
1.5, 1.0, 1.0, 0.5, 0.0
1.5, 2.0, 1.0, 0.5, 0.1
1.5, 3.0, 2.0, 1.0, 0.3
1.5, 4.0, 5.0, 1.0, 0.3
1.5, 3.0, 3.0, 1.0, 0.2
1.5, 2.0, 3.0, 1.0, 0.5
1.5, 3.0, 4.0, 2.0, 1.0
1.5, 3.0, 4.0, 2.0, 1.0
1.5, 2.0, 3.0, 1.0, 0.3
W
S

ANNUAL

WINDROSE FOR BOSTON, MASSACHUSETTS

KEY:

Directions are those from which the wind blows. The top vertical line represents North winds. Clockwise follow NNE, NE, ENE, etc. The innermost circle represents the percent occurrence of (0-7) mph winds. The first number expresses the numerical value of this occurrence to the nearest whole percent. Then, radiating outwards for each of sixteen compass points appear percentages for occurrence of winds in 8-12, 13-18, 19-24, 25+ mph speed ranges. The sequence of numbers associated with a particular wind direction indicates the percent frequency of wind speeds in these ranges, 0-7, 8-12, 13-18, 19-24 and over 25 mph.

an annual of monthly

Data is presented for average occurrences.. The data base is the National Weather Bureau of Hourly Observations for Boston, Massachusetts, for the ten-year interval 1951-1960.

PROBABILITY OF ANNUAL EXTREME WINDS IN BOSTON, MASSACHUSETTS*

Mean Recurrence Interval (Years)	25	50	100	200
Probability**	.96	.98	.99	.995
Height Above Ground (feet)	Speed (mph)			
30	76	84	92	102
100	90	100	109	120
200	99	110	120	132
300	104	117	127	141
400	109	121	132	147
500	112	125	138	151
600	116	129	141	155
700	118	131	143	159
800	121	134	147	162
900	122	136	148	163
1000	123	138	150	166

* Based on data from National Weather Records Center, Federal Building, Asheville, N. C., and computed using technique of Thom[1].

** Probability that the Annual Extreme Mile of wind will be less than the speed shown.

Definition of "Annual Extreme Mile" of wind (also called "Annual Fastest Mile"): The wind speed during the passage of the fastest mile of wind in a calendar year. A "mile of wind" can be thought of as a stream of air one mile long.

(1) H. C. S. Thom, American Society of Civil Engineers, Environmental Engineering Conference, Dallas, Texas 1967.

PROBABILITY OF ANNUAL EXTREME WINDS IN BOSTON, MASSACHUSETTS*

Mean Recurrence Interval (Years)	25	50	100	200
Probability**	.96	.98	.99	.995

Height Above Ground (feet)	Speed (mph)			
30	76	84	92	102
100	90	100	109	120
200	99	110	120	132
300	104	117	127	141
400	109	121	132	147
500	112	125	138	151
600	116	129	141	155
700	118	131	143	159
800	121	134	147	162
900	122	136	148	163
1000	123	138	150	166

* Based on data from National Weather Records Center, Federal Building, Asheville, N. C., and computed using technique of Thom(1).

** Probability that the Annual Extreme Mile of wind will be less than the speed shown.

Definition of "Annual Extreme Mile" of wind (also called "Annual Fastest Mile"): The wind speed during the passage of the fastest mile of wind in a calendar year. A "mile of wind" can be thought of as a stream of air one mile long.

(1) H. C. S. Thom, American Society of Civil Engineers, Environmental Engineering Conference, Dallas, Texas 1967.

Appendix B

HISTORIC

MASSACHUSETTS
HISTORICAL
COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State
294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

Scott McCandless
HMM Associates
161 Highland Avenue
Needham, Massachusetts 02194

RE: Devenshire Apartments, Boston

Dear Mr. McCandless:

The Massachusetts Historical Commission has reviewed the site area for the proposed Devonshire apartments. Because the site has been substantially disturbed by past construction, the Massachusetts Historical Commission feels that archaeological resources are not likely to exist in the project area. No impact to significant archaeological resources is expected.

If you should have any questions, please contact Valerie Talmage, State Archaeologist.

Sincerely,

Patricia L. Weslowski

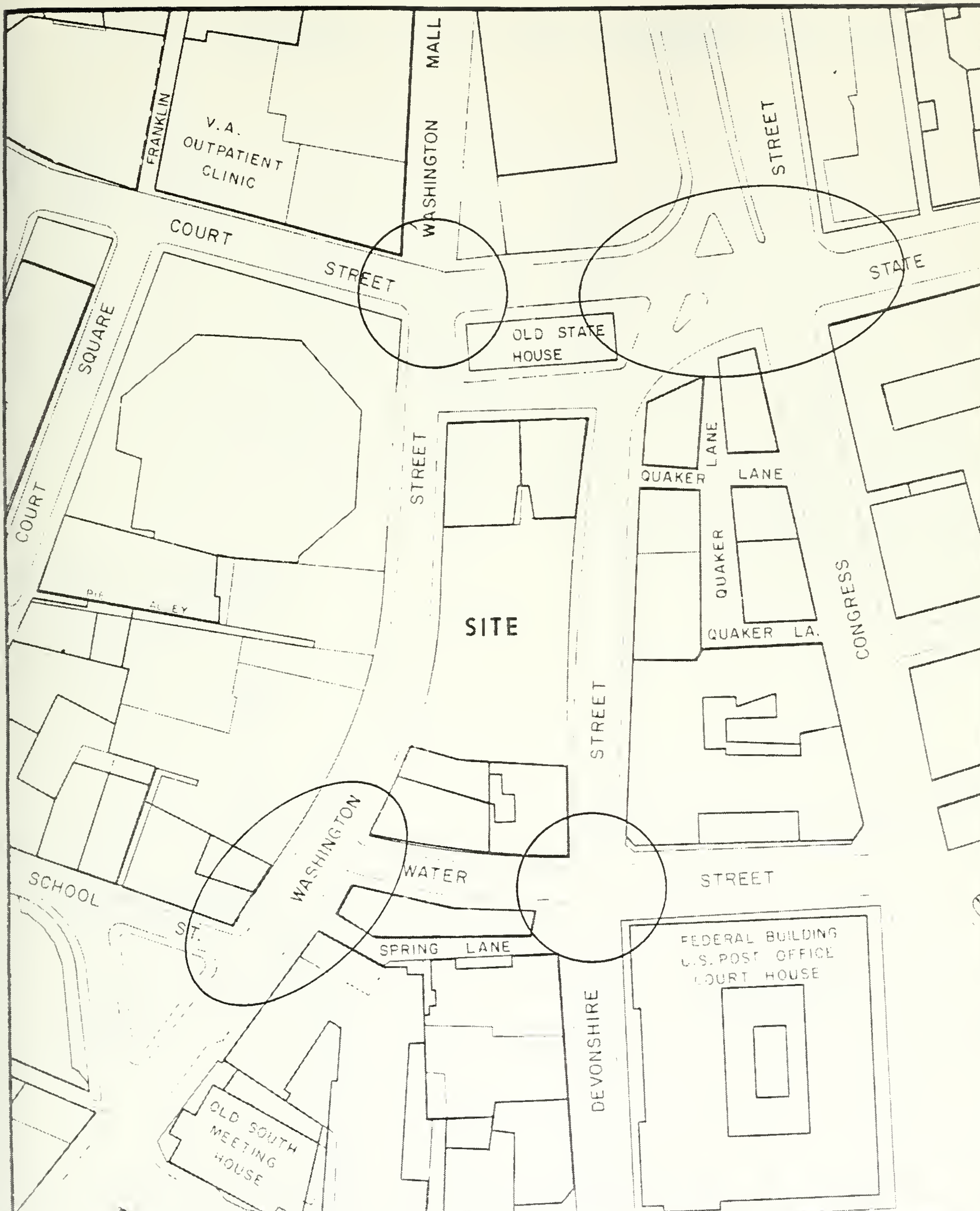
Patricia L. Weslowski
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

PLW/ej

xc: Steve Kaiser, MEPA

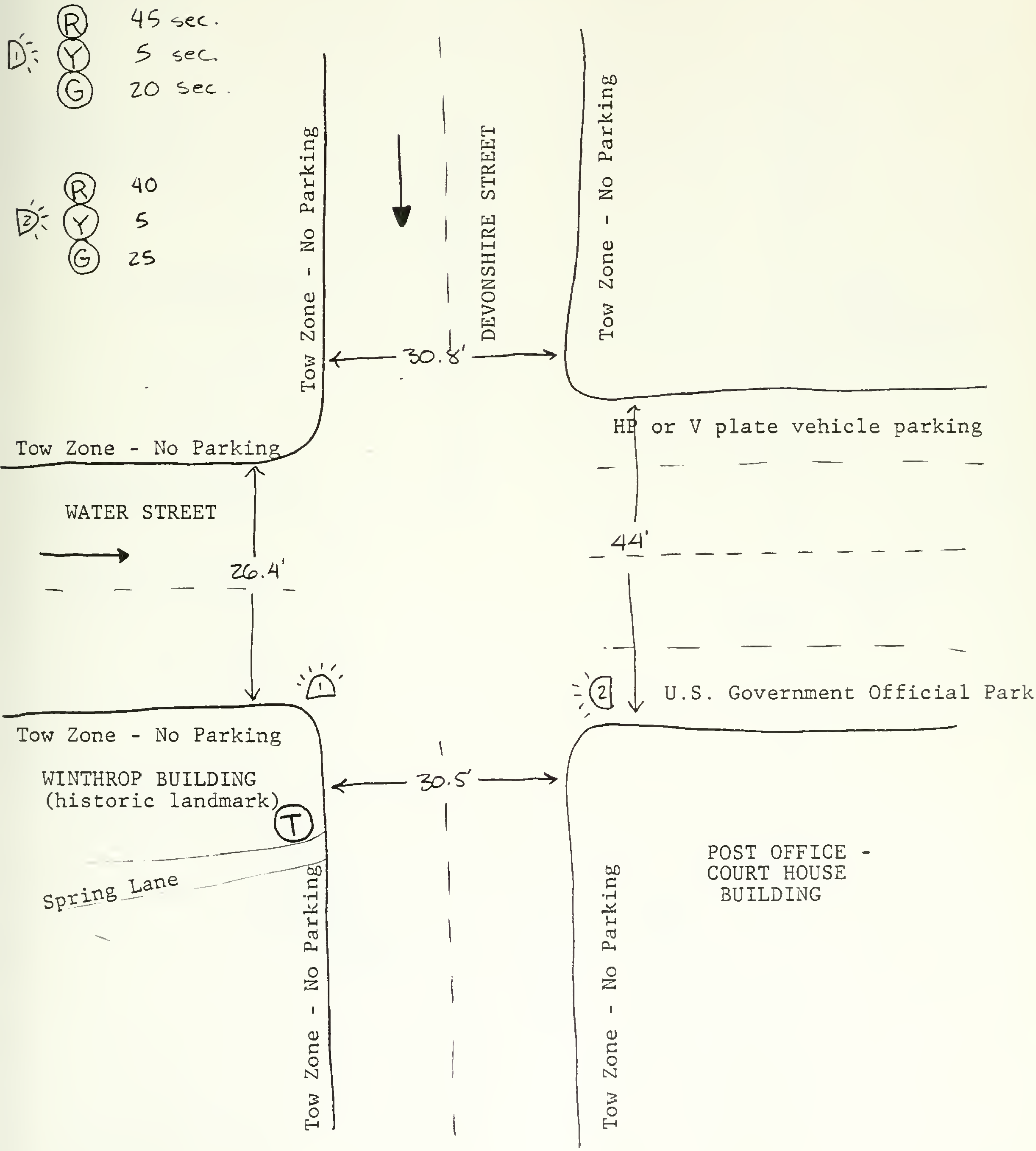
Appendix C

TRAFFIC

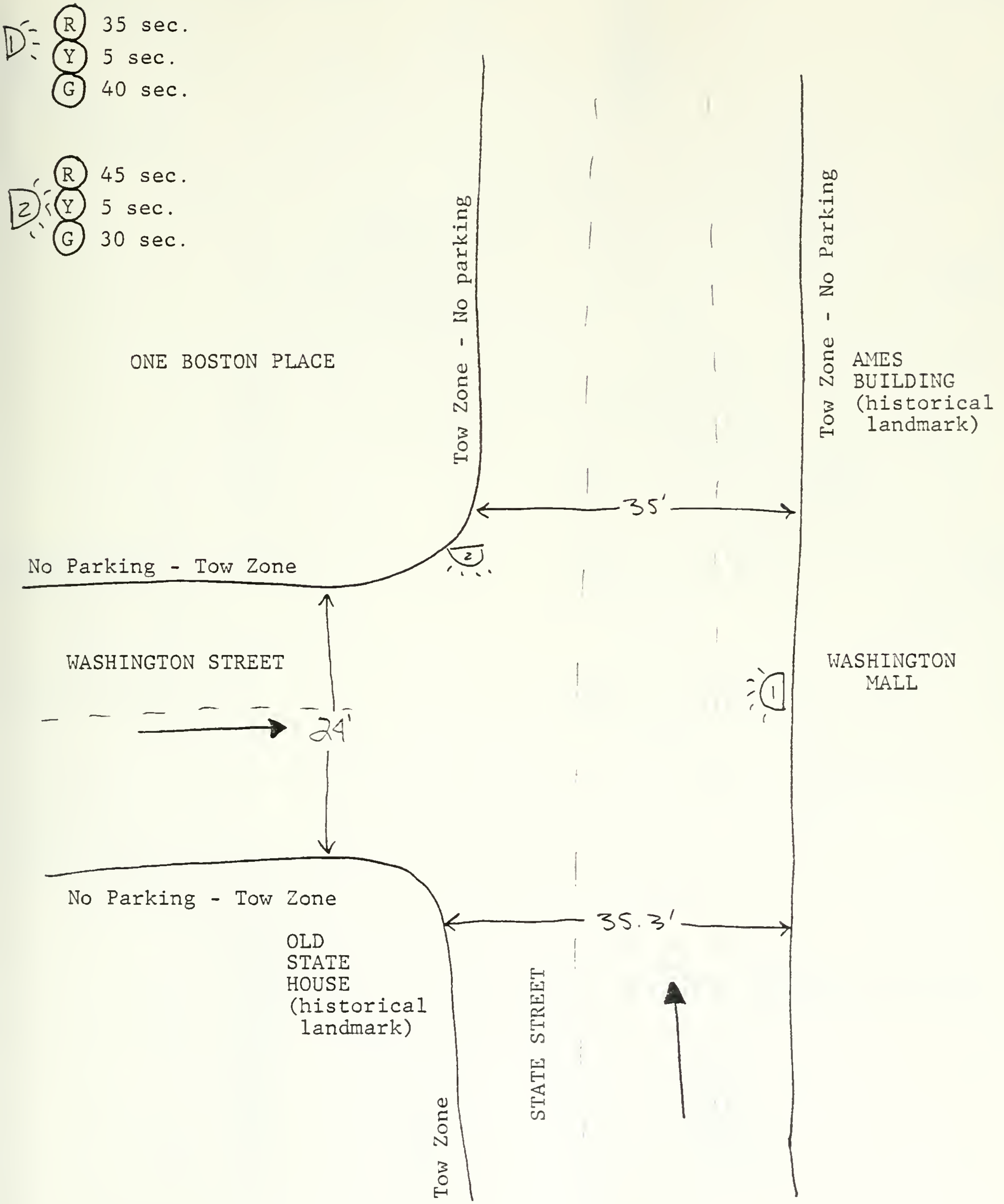


KEY TO MEASURED INTERSECTIONS

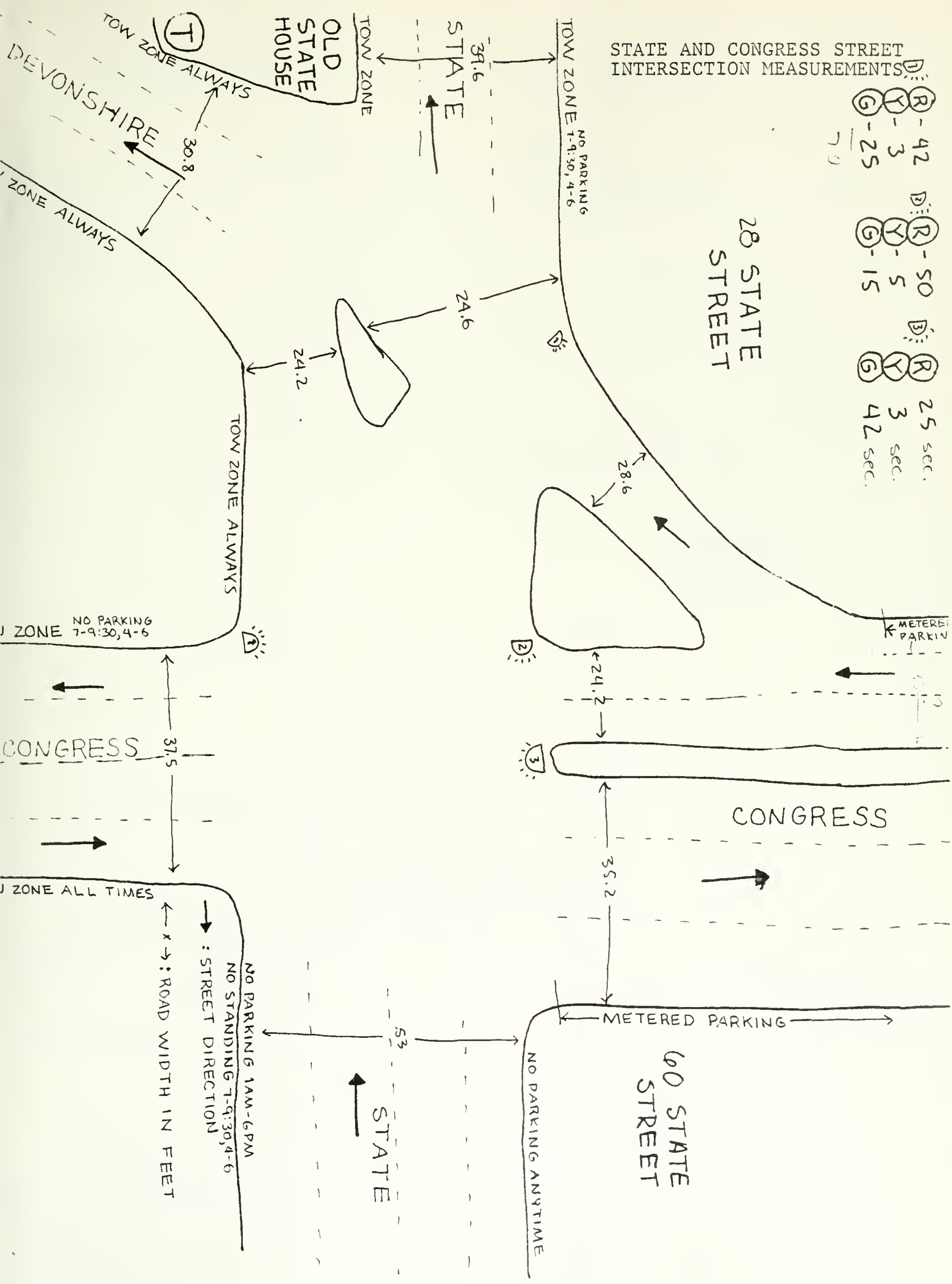
DEVONSHIRE AND WATER STREET INTERSECTION MEASUREMENTS



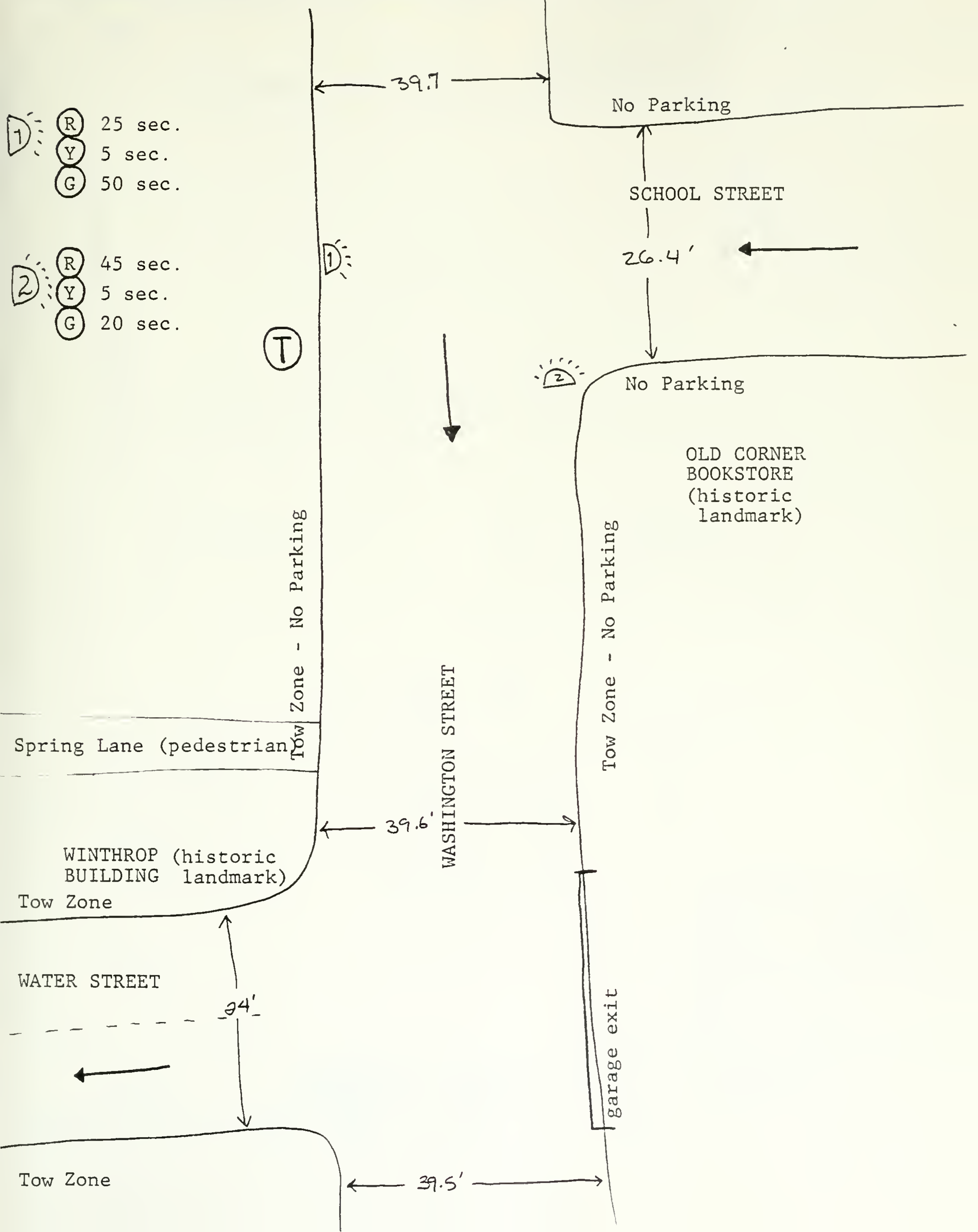
WASHINGTON AND STATE STREET INTERSECTION MEASURMENTS



STATE AND CONGRESS STREET INTERSECTION MEASUREMENTS



WASHINGTON AND WATER, AND WASHINGTON AND SCHOOL STREET INTERSECTIONS



PLANNING ENGINEERING & DEVELOPMENT

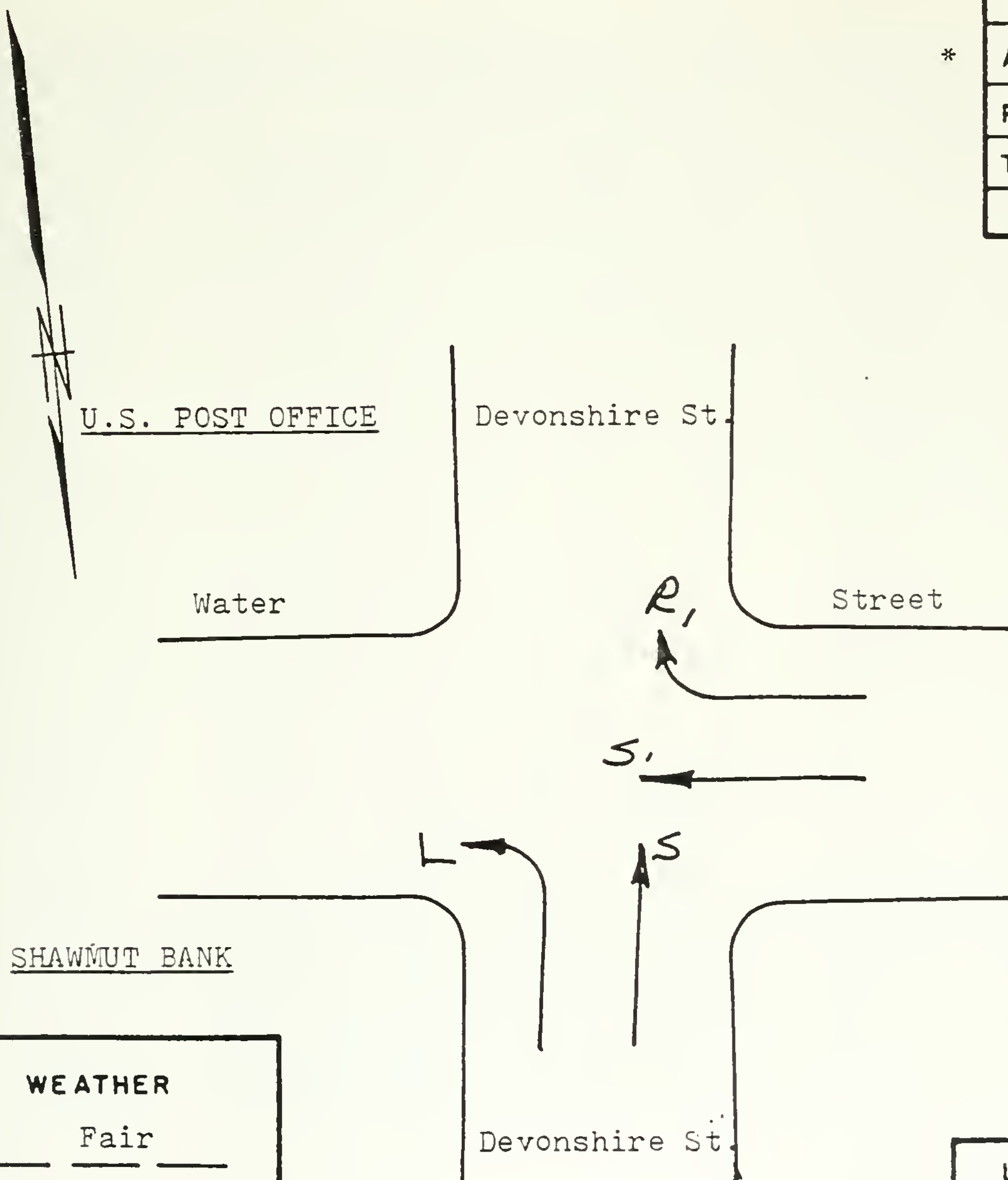
INT. NO.

* 5/16&17/77

CITY	Boston Proper
INTERSECTION	Devonshire Street & Water Street
DATE	*
DAY OF WEEK	Mon-Tue

INTERSECTION TURNING MOVEMENT COUNT #2149BRA

VEHICLES COUNTED	
* ALL	X
PASS. CARS	
TRUCKS	(X)



WEATHER

Fair

COUNT TAKEN BY

J.M.

LENGTH OF COUNT	
TIME	NUMBER OF HOURS
* 7am-6pm	11 hours

STREET	ENTERING VOLUME	FLOW PERCENT
Devonshire St. EB	2181	46
Water Street SB	2582	54
TOTAL	4763	100%

COMMENTS

PLANNING ENGINEERING & DEVELOPMENT

STA.NO. 2149
BRA

TRAFFIC MOVEMENT SUMMARY TABLE

LOCATION Devonshire Street & Water Street CITY OR TOWN Boston Proper

DATE 5/16&17/77 DAY OF WEEK Mon-Tue WEATHER Fair RECORDER J.M.

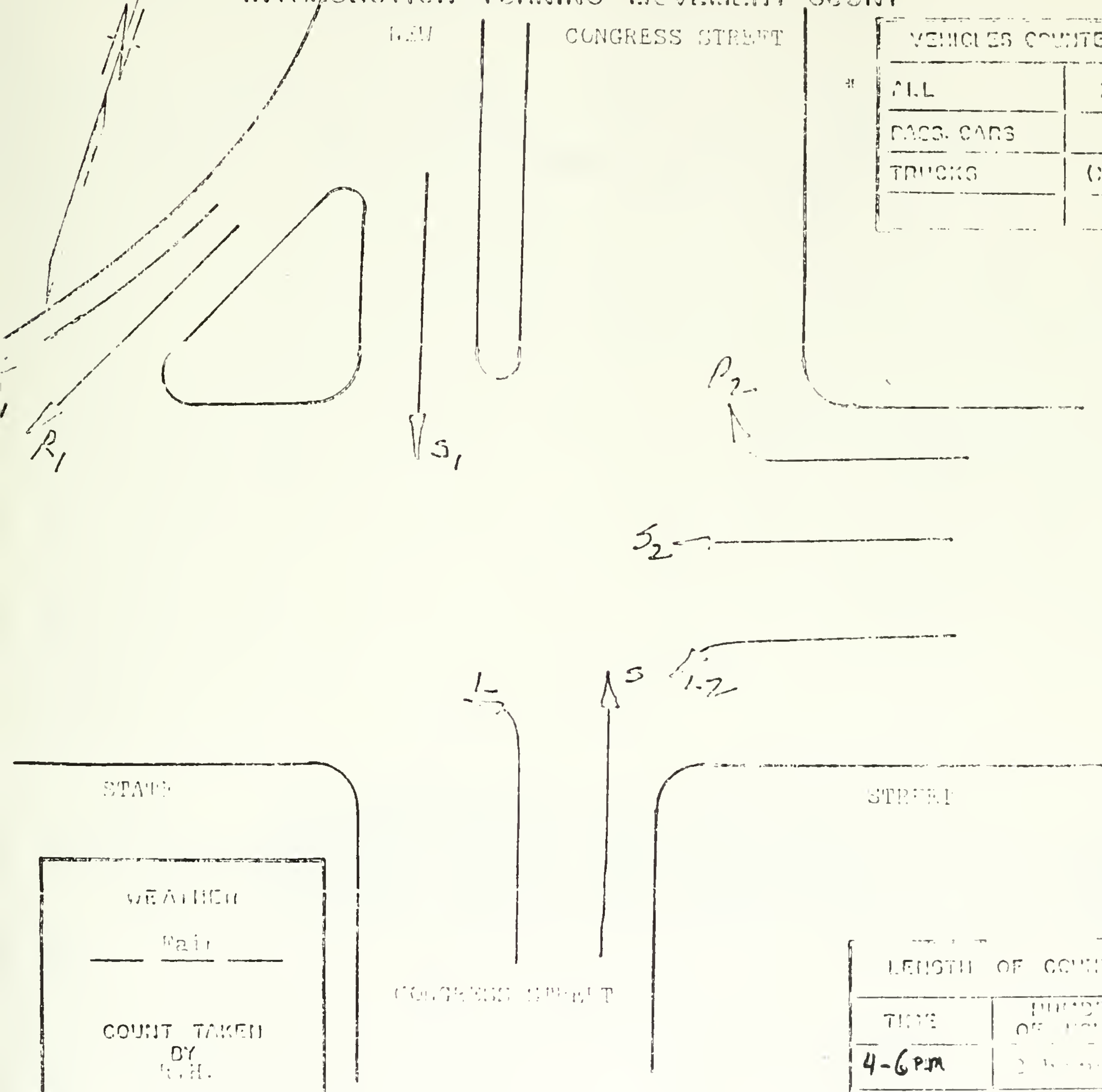
TIME STARTS __M	Devonshire St. Eastbound			Water Street Southbound									TOTAL HALF HOUR TALLY
	L		S	S.		R.							
7:00-7:30	12		45	53		4							114
7:30-8:00	20		56	73		5							154
8:00-8:30	22		96	104		20							242
8:30-9:00	34		77	104		7							222
9:00-9:30	24		96	100		8							228
9:30-10:00	27		63	95		12							197
10:00-10:30	40		56	72		18							186
10:30-11:00	32		59	112		11							214
11:00-11:30	36		52	85		8							181
11:30-12:00	52		60	102		16							230
12:00-12:30	42		53	93		10							198
12:30-1:00	29		59	94		10							192
1:00-1:30	33		52	96		9							190
1:30-2:00	45		70	132		12							259
2:00-2:30	31		56	99		7							193
2:30-3:00	31		71	116		15							233
3:00-3:30	40		61	112		8							221
3:30-4:00	33		59	129		9							250
4:00-4:30	38		60	126		12							236
4:30-5:00	39		55	143		10							247
5:00-5:30	48		83	177		12							320
5:30-6:00	38		76	136		6							256
6:00-6:30													
6:30-7:00													
7:00-7:30													
7:30-8:00													
8:00-8:30													
8:30-9:00													
9:00-9:30													
9:30-10:00													
10:00-10:30													
10:30-11:00													
TOTAL	766		1415	2353		229							GRAND TOTAL
TOTAL OF L.S. & R	2181			2582									4763

PLANNING ENGINEERING & DEVELOPMENT

CITY	Poston Iroper
INTERSECTION	Cong[illegible] Street & State Stree[illegible]
DATE 5/13/76	DAY OF WEEK Thursday

INTERSECTION TURNING MOVEMENT COUNT

#1924PRA



VEHICLES COUNTED	
ALL	X
PASS. CARS	
TRUCKS	(X)

WEATHER
Fair
COUNT TAKEN BY
R.H.

LENGTH OF COUNT	
TIME	NUMBER OF HOURS
4-6 P.M.	2 [illegible]

STREET		ENTERING VOLUME	FLOW PERCENT
Congress St.	NB	1485	33
Congress [illegible]	SB	1770	40
State St.	WB	1213	27
TOTAL		4468	100%

COMMENTS

5:12-5:36 P.M. [illegible]

[illegible]

[illegible] @ 5:36

[illegible] !!!

PLANNING ENGINEERING & DEVELOPMENT

STA NO. 192

TRAFFIC MOVEMENT SUMMARY TABLE

LOCATION Congress Street & State Street CITY OR TOWN Boston Proper

DATE 5/13/76 DAY OF WEEK Thursday WEATHER Fair RECORDER R.H.

TIME STARTS	Congress Street Northbound			Congress Street Southbound			State Street Westbound						TOTAL TALLY
	L		S	S1	R1	SR1	L2	S2	R2	STATE	C(SB) TOTAL	C(NB)	
7:00-7:30													
7:30-8:00													
8:00-8:30													
8:30-9:00													
9:00-9:30													
9:30-10:00													
10:00-10:30													
10:30-11:00													
11:00-11:30													
11:30-12:00													
12:00-12:30													
12:30-1:00													
1:00-1:30													
1:30-2:00													
2:00-2:30													
2:30-3:00													
3:00-3:30													
3:30-4:00													
4:00-4:30	11		367	308	53	88	31	139	139	309	[illegible]	378	1136
4:30-5:00	3		409	281	66	120	23	138	141	302	467	[illegible]	1181
5:00-5:30	4		354	323	44	94	16	135	108	259	461	358	1078
5:30-6:00	3		334	247	42	104	11	181	151	343	393	33[illegible]	1073
6:00-6:30													
6:30-7:00													
7:00-7:30													
7:30-8:00													
8:00-8:30													
8:30-9:00													
9:00-9:30													
9:30-10:00													
10:00-10:30													
10:30-11:00													
TOTAL	21		1464	1159	205	406	81	593	539				GRAND TOTAL
TOTAL OF	1485			1770			1213						4468

This turn no longer exists:
The space between the Old State House and the block on which the site is located is converted for pedestrains only. There is no right turn from Washington Street anymore.

Traffic Engineering & Development

* 2/10+21/75

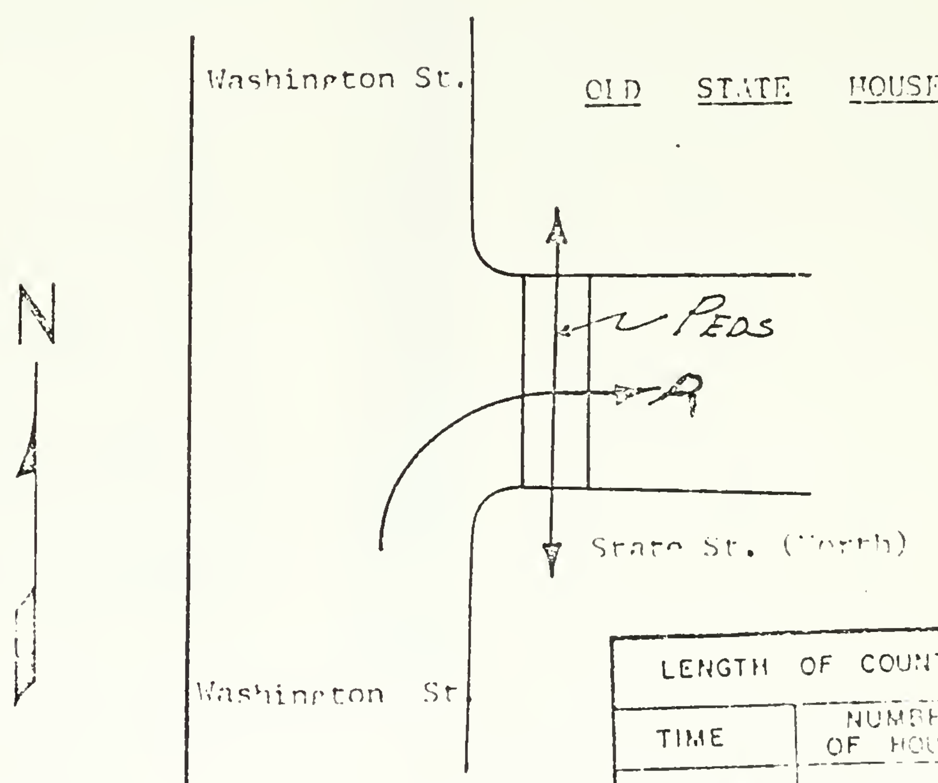
CITY Boston [illegible]
INTERSECTION State Street (North) & Washington Street
DATE * DAY OF WEEK Thur-Fri

INTERSECTION TURNING MOVEMENT COUNT ·1600

VEHICLES COUNTED	
* ALL	X
PASS. CARS	
TRUCKS	(X)
* Peds	

Vehicle Classifications

P = Passenger vehicle
T1 = Light truck or pick-up/single tires & axle
T2 = Medium truck/dual rear tires & single rear axle
T3 = Heavy truck/dual rear axles
T4 = Semi-trailer
B = Bus



WEATHER

Fair

COUNT TAKEN BY

W.C.

LENGTH OF COUNT	
TIME	NUMBER OF HOURS
* 7am-6pm	11 hours

STREET	ENTERING VOLUME	FLOW PERCENT
P	476	86
T1	59	11
T2	21	3
T3	0	0
T4	0	0
B	0	0
TOTAL	556	100%

COMMENTS

STA. NO 1600

TRAFFIC MOVEMENT SUMMARY TABLE

LOCATION State St. (North) & Washington St. CITY OR TOWN Boston Proper

DATE ?/10&11/75 DAY OF WEEK Thur-Fri WEATHER Fair RECORDER E.C.

TIME STARTS __M	"R" Right turning vehicles						Pedestrians					TOTAL HALF HOURLY TALLY
	P	T1	T2	T3	T4	B		Peds.				
7:00-7:30	4	0	1	0	0	0		9				[illegible]
7:30-8:00	8	6	0	0	0	0		28				[illegible]
8:00-8:30	9	4	2	0	0	0		90				155
8:30-9:00	10	1	1	0	0	0		199				[illegible]
9:00-9:30	18	0	0	0	0	0		237				[illegible]
9:30-10:00	18	2	0	0	0	0		123				[illegible]
10:00-10:30	28	4	3	0	0	0		154				[illegible]
10:30-11:00	22	1	1	0	0	0		184				[illegible]
11:00-11:30	24	4	0	0	0	0		234				[illegible]
11:30-12:00	31	1	1	0	0	0		321				[illegible]
12:00-12:30	24	7	0	0	0	0		456				[illegible]
12:30-1:00	27	3	1	0	0	0		623				[illegible]
1:00-1:30	14	0	2	0	0	0		788				[illegible]
1:30-2:00	25	1	2	0	0	0		655				[illegible]
2:00-2:30	19	4	1	0	0	0		518				[illegible]
2:30-3:00	25	5	2	0	0	0		408				[illegible]
3:00-3:30	32	2	2	0	0	0		284				[illegible]
3:30-4:00	27	3	1	0	0	0		208				[illegible]
4:00-4:30	14	5	0	0	0	0		264				[illegible]
4:30-5:00	32	1	1	0	0	0		269				[illegible]
5:00-5:30	35	4	0	0	0	0		482				[illegible]
5:30-6:00	30	1	0	0	0	0		231				[illegible]
6:00-6:30												
6:30-7:00								6762				
7:00-7:30												
7:30-8:00												
8:00-8:30												
8:30-9:00												
9:00-9:30												
9:30-10:00												
TOTAL	476	59	21	0	0	0						GRAND TOTAL
			556									[illegible]

WASHINGTON & STATE

WORKSHEET B--CAPACITY ANALYSIS (see instructions following)

Step	Symbol	Input/Units				
1	i	Road segment (or approch) designation	W (NB)		STATE (WB)	
2		Free flow capacity computation:				
2.1	M_i	Number of lanes				
2.2	W_f	Adjustment for lane width (Table B-1)				
2.3	T_i	Adjustment for trucks (Table B-2)				
2.4	C_i	Free flow capacity				
3		Signalized intersection capacity:				
3.1	j	Green signal phase identification				
3.2	Wa_i	Approach width with parking (ft)	24		43	
3.3		Percent right turners	0		0	
3.4		Percent left turners	100		0	
3.5		Metropolitan area size				
3.6	$Cs_{i,j}$	Capacity service volume (vph of green)	1550		3350	
4		Signalized intersection green phase and cycle length:				
4.1	$V_{i,j}$	Demand volume for approach and phase	650		1000	
4.2	$V_{i,j}/Cs_{i,j}$	Volume to green capacity ratio	.32		.3	
4.3	approx G/Cy	Approximate G/Cy				
4.4	$\sum_j \max(V_{i,j}/Cs_{i,j})$	Sum of the maximum V/C ratios for each signal phase				
4.5	Cy	Signal cycle time (sec)	80		80	
4.6	Gj	Green phase length	40		30	
4.7	Gj/Cy	Green phase to cycle time ratio	.5		.375	
4.8	$C_{i,j}$	Capacity for approach i phase i	750		1256	
		Two-way stop, two-way yield or uncontrolled intersection:				
5.1	$V_m + V_n$	Major street two-way volume				
5.2	C_i	Cross street capacity				
6		Four-way stop intersections:				
6.1	V_i	Approach volume				
6.2	Spi	Demand split on cross streets				
6.3	C_i	Capacity of approach				
	C_i	Approach capacity $\sum_j C_{i,j}$ 5.2 for a four-way stop or 6.3 for a two-way stop				

CONGRESS/[illegible]

WORKSHEET B--CAPACITY ANALYSIS (see instructions following)

Step	Symbol	Input/Units				
1	i	Road segment (or approch) designation	C(SB)	C(NB)		S(WB)
2		Free flow capacity computation:				
2.1	M_i	Number of lanes				
2.2	W_f	Adjustment for lane width (Table B-1)				
2.3	T_i	Adjustment for trucks (Table B-2)				
2.4	C_i	Free flow capacity				
3		Signalized intersection capacity:				
3.1	j	Green signal phase identification				
3.2	Wa_i	Approach width with parking (ft)	33	46		61
3.3		Percent right turners	35%	0		44
3.4		Percent left turners	0	1		0
3.5		Metropolitan area size				
3.6	$Cs_{i,j}$	Capacity service volume (vph of green)	2400	3400		4600
4		Signalized intersection green phase and cycle length:				
4.1	$V_{i,j}$	Demand volume for approach and phase	930	800		610
4.2	$V_{i,j}/Cs_{i,j}$	Volume to green capacity ratio	.39	.24		.13
4.3	approx G/Cy	Approximate G/Cy				
4.4	$\sum_j \max(V_{i,j}/Cs_{i,j})$	Sum of the maximum V/C ratios for each signal phase				
4.5	Cy	Signal cycle time (sec)	70	70		70
4.6	Gj	Green phase length	25	42		15
4.7	Gj/Cy	Green phase to cycle time ratio	.36	.6		.21
4.8	$C_{i,j}$	Capacity for approach i phase i	864	2040		966
5		Two-way stop, two-way yield or uncontrolled intersection:				
5.1	$V_m + V_n$	Major street two-way volume				
5.2	C_i	Cross street capacity				
6		Four-way stop intersections:				
6.1	V_i	Approach volume				
6.2	Spi	Demand split on cross streets				
6.3	C_i	Capacity of approach				
	C_i	Approach capacity $\sum_j C_{i,j}$ 5.2 for a four-way stop or 6.3 for a two-way stop				

DEVONSH[illegible]

WORKSHEET B--CAPACITY ANALYSIS (see instructions following)

Step	Symbol	Input/Units				
1	i	Road segment (or approch) designation	D(SB)		W(EB)	
2		Free flow capacity computation:				
2.1	M_i	Number of lanes				
2.2	W_f	Adjustment for lane width (Table B-1)				
2.3	T_i	Adjustment for trucks (Table B-2)				
2.4	C_i	Free flow capacity				
3		Signalized intersection capacity:				
3.1	j	Green signal phase identification				
3.2	Wa_i	Approach width with parking (ft)	38		34	
3.3		Percent right turners	0		9	
3.4		Percent left turners	0		0	
3.5		Metropolitan area size	2×10^6			
3.6	$Cs_{i,j}$	Capacity service volume (vph of green)	2800		2400	
4		Signalized intersection green phase and cycle length:				
4.1	$V_{i,j}$	Demand volume for approach and phase	245	(1977)	345	
4.2	$V_{i,j}/Cs_{i,j}$	Volume to green capacity ratio	.09		.14	
4.3	approx G/Cy	Approximate G/Cy				
4.4	$\sum_j \max(V_{i,j}/Cs_{i,j})$	Sum of the maximum V/C ratios for each signal phase				
4.5	Cy	Signal cycle time (sec)	70		70	
4.6	Gj	Green phase length	20		25	
4.7	Gj/Cy	Green phase to cycle time ratio	.29		.36	
4.8	$C_{i,j}$	Capacity for approach i phase i	812		864	
5		Two-way stop, two-way yield or uncontrolled intersection:				
5.1	$V_m + V_n$	Major street two-way volume				
5.2	C_i	Cross street capacity				
6		Four-way stop intersections:				
6.1	V_i	Approach volume				
6.2	Spi	Demand split on cross streets				
6.3	C_i	Capacity of approach				
7	C_i	Approach capacity $\sum_j C_{i,j}$ 5.2 for a four-way stop or 6.3 for a two-way stop				

Appendix D

AIR QUALITY

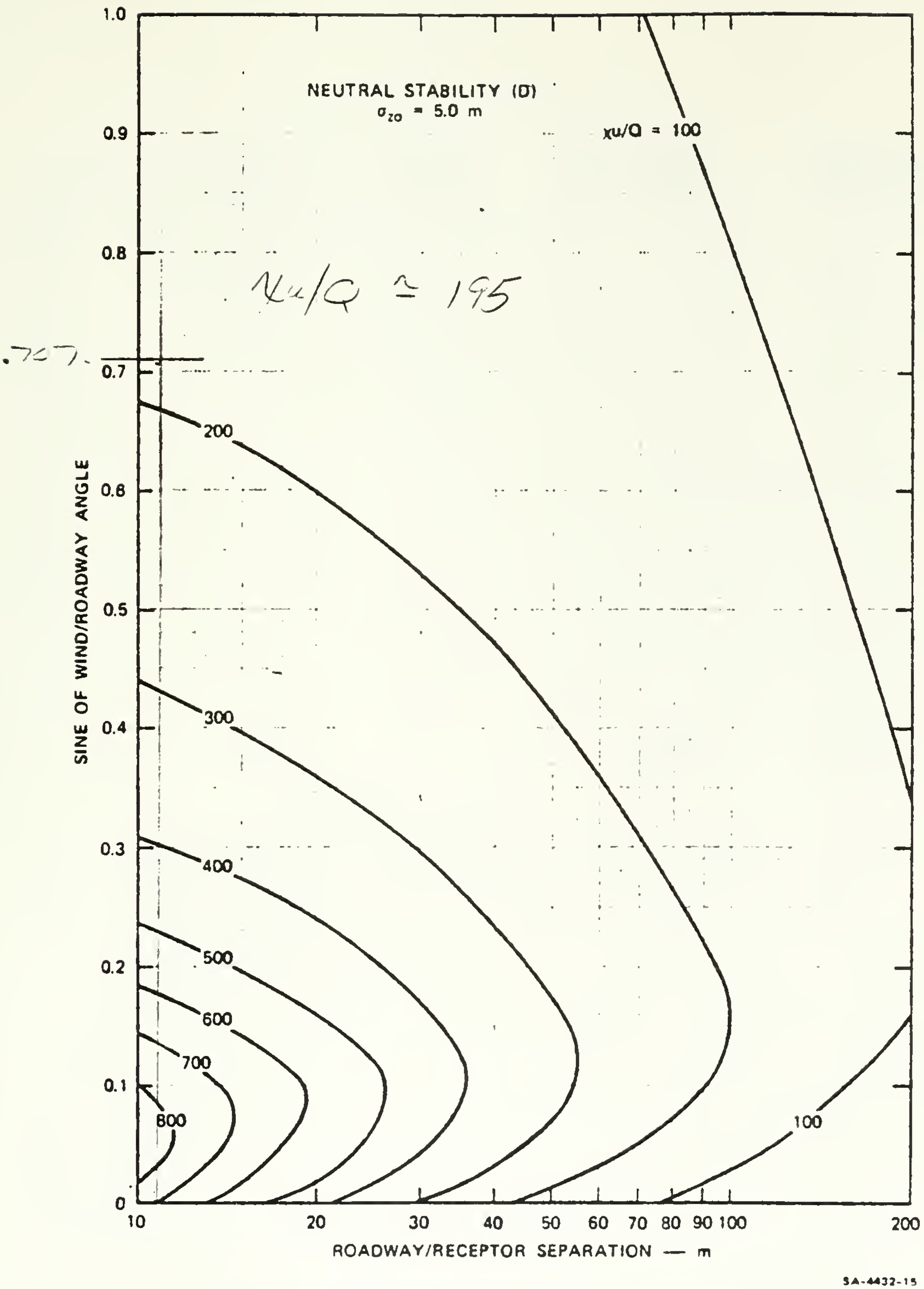


FIGURE 9d VALUES OF χu/Q ($10^{-3}m^{-1}$) FOR VARIOUS ROADWAY/RECEPTOR SEPARATIONS AND WIND/ROADWAY ANGLES; INFINITE LINE SOURCE

SCENARIO #1

90 LDV Idling, 1979

Model Year	No. Vehicles	Miles Traveled	Emission Rate g/min	Emissions
1979	8	8,000	5.43+(.8)(.83)	48.8 g/min.
1978	12	23,000	5.43+(3.2)(.83)	88.1
1977	11	37,000	5.43+(3.7)(.83)	93.5
1976	12	50,000	5.43+(5.0)(.83)	115.0
1975	9	62,000	5.43+(6.2)(.83)	95.2
1974	7	71,000	12.73+(7.1)(2.92)	234.2
1973	7	81,000	12.73+(8.1)2.92)	254.7
1972	5	90,000	12.73+(9.0)(2.92)	195.0
1971	4	99,000	12.73+(9.9)(2.92)	166.6
1970	3	> 100,000	12.73+(10)(2.92)	125.8
1969	2	> 100,000	12.73+(10)(2.92)	83.9
1968	2	> 100,000	12.73+(10)(2.92)	83.9
≥ 1968	8	> 100,000	16.42+(10)(2.55)	335.4
	90		g/min.	1920.1

1920.1 g/min. ÷ 60 sec/min ÷ 150 m =.21 g/m/sec.

Source: EPA Mobil Source Emission Factors, Mar. 1978

SCENARIO #1

use Vol #9 Figure 9d.

1. Roadway receptor seperation @ 9M

2. Roadway angle assumed 45^{o}
   sin 45^{o} 707

3. Stability D

4. Ozu 5.0m

5. $\chi a/Q = 195$

6. Assume ground level wind speed @ 2m/sec.

7. 190 ÷ 2 m/sec x .21 g/m/sec = 20.5 mg/M^3
   Existing background = 7ppm

Source: Lafayette Place Final EIS, Nov. 1978

SCENARIO #2

90 LDV IDLING, 1982

Model Year	No. Vehicles	Miles Traveled	Emission Rates g/min	g/min Emissions
1982	8	8,000	.41+(.8)(.59)	3.8
1981	12	23,000	.41+(2.3)(.59)	16.3
1980	11	37,000	.88+(3.7)(.67)	36.9
1979	12	50,000	5.43+(5)(.83)	115.0
1978	8	62,000	5.43+(6.2)(.83)	95.2
1977	7	71,000	5.43+(7.1)(.83)	79.3
1976	7	81,000	5.43+(8.1)(.83)	85.1
1975	5	90,000	5.43+(9)(.83)	64.5
1974	4	99,000	12.73+(9.9)(2.92)	115.6
1973	3	>100,000	12.73+(10)(2.92)	629.0
1972	2	>100,000	12.73+(10)(2.92)	629.0
1971	2	>100,000	12.73+(10)(2.92)	629.0
1971	8	>100,000	12.73+(10)(2.92)	629.0
	90		g/min	1240.7

1240.7 g/min ÷ 60 sec/min ÷ 150m = .138 g/m/sec
66% Scenario #1

Source: EPA Mobil Source Emission Factors, Mar. 1978

SCENARIO #2

$$\Delta X_L = \Delta \frac{K\ Q's\ (10^3)}{(u+0.5)\ (x^2+z^2)^{\frac{1}{2}} + L_0}$$

$$\Delta X_L = \frac{(7)\ (.138 g/m/sec)\ (10)^3}{(4+0.5)\ (9^2+2^2)^{\frac{1}{2}}+2m}$$

$$\Delta X_L = \frac{9.66 \times 10^2}{(4.5)\ (85^{\frac{1}{2}}) + 2}$$

$$\Delta X_L = \frac{9.66 \times 10}{43.5} = 22.2 \ mg/M^3$$

$$\simeq 19.4 \ ppm$$

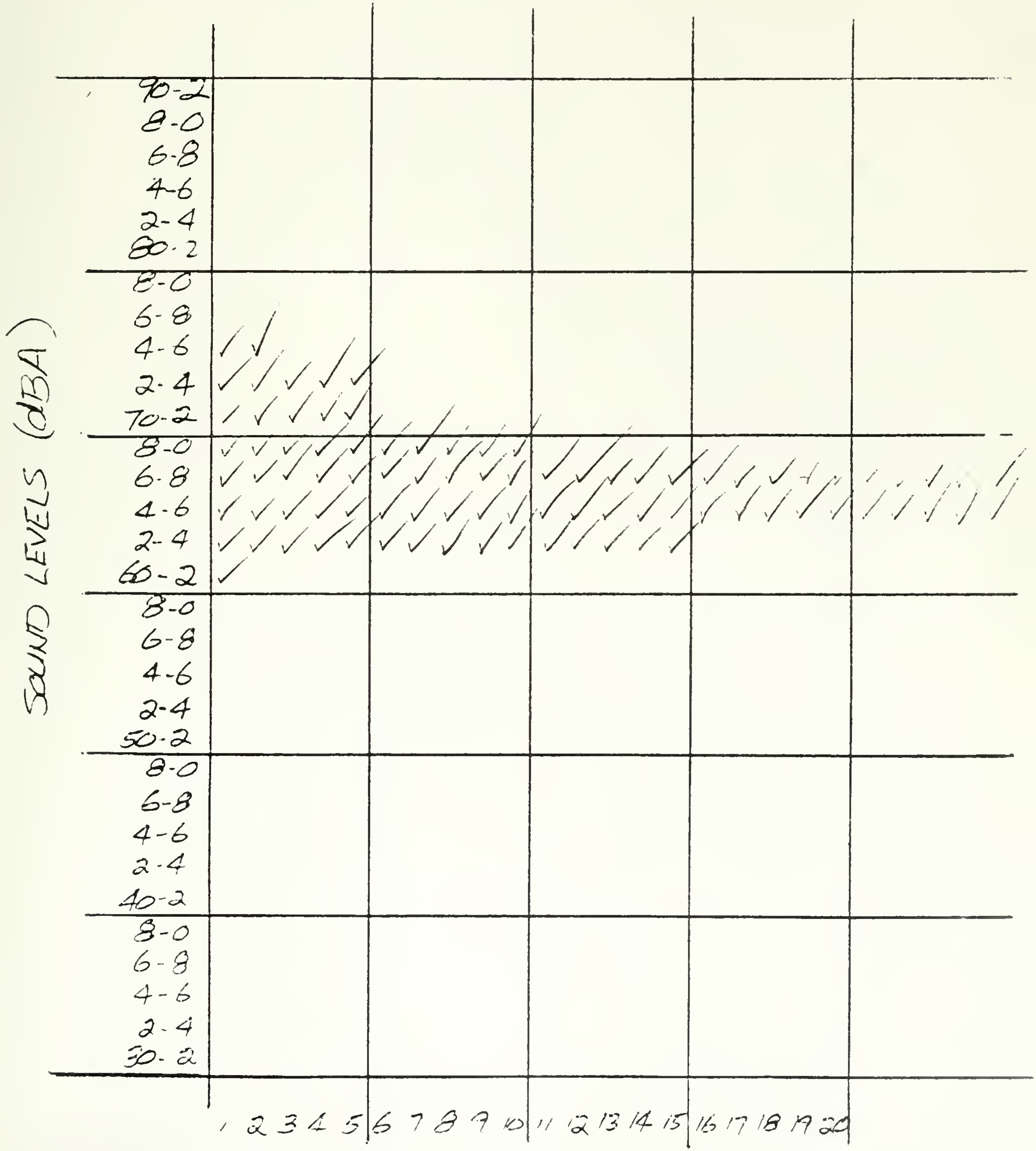
Q's = emission factor
u = wind speed at rooftop
x = distance from roadway center to receptor
z = height of receptor
L_0 = approximate vehicle length
K = empirical constant

Appendix E

NOISE

NOISE MEASUREMENTS

Date [illegible]
Location [illegible]
Time 3:00 [illegible]
Technician [illegible]



NOISE MEASUREMENTS

Date: [illegible]
Location: [illegible]
Time: [illegible]
Technician: [illegible]

SOUND LEVELS (dBA)

Sound Levels (dBA)	1–5	6–10	11–15	16–20	
90-2, 8-0, 6-8, 4-6, 2-4, 80-2					
8-0, 6-8, 4-6, 2-4, 70-2				L_{10}	73
8-0, 6-8, 4-6, 2-4, 60-2	/////	/////	//	Leq	≃ 67.6
8-0, 6-8, 4-6, 2-4, 50-2					
8-0, 6-8, 4-6, 2-4, 40-2			aircraft		
8-0, 6-8, 4-6, 2-4, 30-2					

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

$$\text{Existing } L_{eq} = 10 \log \frac{1}{N} \sum_{n=i}^{N} n_i 10^{Li/10}$$

$$L_{eq} = 10 \log \frac{1}{100} \sum_{n=i}^{N} (1 \cdot 10^{61/10} + 15 \cdot 10^{63/10} + 36 \cdot 10^{65/10} + 26 \cdot 10^{67/10} + 10 \cdot 10^{69/10} + 5 \cdot 10^{71/10} + 5 \cdot 10^{73/10} + 2 \cdot 10^{75/10})$$

$$L_{eq} = 10 \log \frac{1}{100} (1 \cdot 10^{6.1} + 15 \cdot 10^{6.3} + 36 \cdot 10^{6.5} + 26 \cdot 10^{6.7} + 10 \cdot 10^{6.9} + 5 \cdot 10^{7.1} + 5 \cdot 10^{7.3} + 2 \cdot 10^{7.5})$$

$$L_{eq} = 10 \log (10^{4.1} + 15 \cdot 10^{4.3} + 36 \cdot 10^{4.5} + 26 \cdot 10^{4.7} + 10 \cdot 10^{4.9} + 5 \cdot 10^{5.1} + 5 \cdot 10^{5.3} + 2 \cdot 10^{5.5})$$

$$L_{eq} = 67.6 \text{ dB}$$

SCENARIO #1

1. $L_{eq}(h)$ for 3 trucks per hour

   $L_{eq}(h) = L_j$+E.F.

   $L_{eq}(h) = 86=(-9)$ See Table 2 of Highway Noise

   $L_{eq}(h) =$ 77dBA @ 50 ft.

2. $L_{eq}(h)$ for 1 heavy truck idling

   $L_{eq}(h) = L_j$=E.F.

   $L_{eq} = 70=0 = 70$ dBA @ 50 ft.

3. $L_{eq}(h)$ for 1 power shovel

   $L_{eq}(h) = L_j$=E.F

   $L_{eq}(h) = 83+(-7)$

   $L_{eq}(h) =$ 77dBA @ 50 ft.

4. $L_{eq}(h)$ for 1 front end loader

   $L_{eq}(h) = L_j$+E.F.

   $L_{eq}(h) = 79+(-3)$

   $L_{eq}(h) =$ 76 dBA @ 50 ft.

5. $L_{eq}(h)$ for 1 compressor

   $L_{eq}(h) = L_j$=E.F.

   $L_{eq}(h) = 81 +(0)$

   $L_{eq}(h) =$ 81 dBA @ 50 ft.

$$L_{eq}(h)\ \text{site} = 10 \log \quad 10^{L_{eq}/10}$$

$$L_{eq}(h)\ \text{site} = 10 \log (10^{7.7}+10^{7}+10^{7.7}+10^{7.6}+10^{8.1})$$

$$L_{eq}(h)\ \text{site} + 84.4\text{dBA} @ 50 \text{ ft.}$$

$$L_{eq}(h)\ \text{site} = L_{eq}\ \text{ref} - 20 \log D/D_o$$

$$L_{eq}(h)\ \text{site} @ 100 \text{ ft} = 84.4 - 20 \log \frac{100}{50} = 78.4 \text{ dBA}$$

$$L_{eq}(h)\ \text{site} @ 150 \text{ ft} = 84.4 - 20 \log \frac{150}{50} = 74.9 \text{ dBA}$$

$$L_{eq}(h)\ \text{site} @ 200 \text{ ft} = 84.4 - 20 \log \frac{200}{50} = 72.4 \text{ dBA}$$

$$L_{eq}(\text{site}) @ x \text{ ft.} = 84.4 - 20 \log \frac{x}{50}$$

$$80 \text{ dBA} = 84.4 - 20 \log \frac{x}{50}$$

$$4.4 \text{ dBA} = 20 \log \frac{x}{50} \qquad \frac{4.4}{50} = \log \frac{x}{50}$$

$$x = 82.9' \simeq 83' \qquad L_{eq} = 80 \text{ dBA} @ 83'$$

$$75 \text{ dBA} = 84.4 - 0 \log \frac{y}{50}$$

$$9.4/2.0 = \log \frac{y}{50}$$

$$y = 147.56 \simeq 148' \qquad L_{eq} = 75 @ 148'$$

$$70 \text{ dBA} = 84.4 - 20 \log \frac{2}{50}$$

$$14.4/20 = \log \frac{2}{50}$$

$$z = 262.4 \simeq 262' \qquad L_{eq} = 70 @ 262'$$

CONSTRUCTION NOISE SCENARIOS

Scenario #1	Noise Level (dBA) [1 2]	Daily Usage Factor [3]
3 trucks per hour removing earth	86	0.1*
1 heavy diesel dump truck idling	70*	1.0
1 power shovel	83	.16
1 front end loader	79	0.4
1 compressor	81	1.0
Duration 2 - 4 months		

Scenario #2		
6 trucks per hauling concrete	86	0.2*
2 heavy trucks idling	70*	1.0
1 compressor	81	1.0
1 concrete pump	82	0.4
Duration 4 days		

Sources:
1. U.S. Environmental Protection Agency; Document NTID 300.1; "Noise from Construction Equipment and Operations, Building Equipment and Home Appliences," December, 1971.

2. At a reference distance of 50 feet

3. Defined as the time ratio of daily time at maximum engine power to the time at idle or shutdown condition.

* Assumed Values

SCENARIO #2

1. $L_{eq}(h)$ for 6 trucks per hour

$L_{eq}(h) = L_j + E.F.$

$L_{eq}(h) = 86 + (-7) = 79 dBA$ @ 50 ft.

2. $L_{eq}(h)$ for 2 trucks idling

$L_{eq}(h) = 70\ dBA + 70\ dBA + (0) = 73\ dBA$ @ 50 ft.

3. $L_{eq}(h)$ for 1 compressor

$L_{eq}(h) = L_j + E.F.$

$L_{eq}(h) = 81 + 0 = 81\ dBA$ @ 50 ft.

4. $L_{eq}(h)$ for 1 concrete pump

$L_{eq}(h) = L_j + E.F.$

$L_{eq}(h) = 82 = (-4) = 78\ dBA$ @ 50 ft.

$L_{eq}(h)site = 10 \log\ 10^{L_{eq}/10}$

$L_{eq}(h)site = 10 \log\ (10^{7.9} + 10^{7.3} + 10^{8.1} + 10^{7.8})$

$L_{eq}(h)site = 83.3\ dBA$ @ 50 ft.

$L_{eq}(h)site$ @ 100 ft. $= L_{eq}ref - 20 \log D/Do$

$83.2 - 20 \log 100/50 = 77.2\ dBA$

$L_{eq}(h)site$ @ 150 ft. $= 73.3\ dBA$

$L_{eq}(h)site$ @ 200 ft. $= 71.2\ dBA$

CONSTRUCTION EQUIPMENT NOISE EMISSION CHARACTERISTICS

Equipment	Noise Level (dBA)	Daily Usage Factor
Earthmoving		
front loader	79	0.4
backhoes	85	0.16
dozers	80	0.4
tractors	80	0.4
scrapers	88	0.4
graders	85	0.08
truck	86	0.4
paver	89	0.1
Materials Handling		
concrete mixer	85	0.4
concrete pump	82	0.4
crane	83	0.16
derrick	88	0.16
Stationary		
pumps	76	1.0
generators	78	1.0
compressors	81	1.0
Impact		
pile drivers	101	0.04
jack hammers	88	0.1
rock drills	98	0.04
penumatic tools	86	0.16
Other		
saws	78	0.04
vibrator	76	0.4
steam blowout	129	0.01
public address system	120	0.01
batch plant	93	1.0

Excavation	3 trucks per hour peak
	+ 1 power shovel
	+ 1 front end loader
	+ 1 compressor
	2-4 months duration
Superstructure/ Foundations	6 per hour - concrete trucks
	1 tower crane
	1 compressor
	1 concrete pump

Appendix F

SOLID WASTE

Solid Waste Calculations

Retail Space = 8000 sf @ #/100sf = 320 #/Day

Residential Space = 672 br @ 4#/br = 2688/Day

Office Space = 100,000 sf @ 1#/100 sf	=	1000#/Day
Total Waste		4000#/Day

Assuming 400#/Cu. Yd. Waste Volume = 10 Cu. Yds/Day

Assuming 40 Yds/Truck 2 Trucks per week

Appendix G

ENERGY

Estimated Lighting & Equipment Data

	Area (sf)	w/sf LTG.	w/sf APPL.	KW
Apartments (478)	450,000	2.5	Per N.E.C	1140
Retail Shops	6,400	4	10	90
Office Areas	98,000	3	2	490
Parking Garage	41,700	.24	-	10
Public & House Ltg.	52,200	1.9	1	150
		subtotal		1180

HVAC Equipment

Air Conditioning Plant Consisting of Chillers, Ch. Water & Cond. Water Pumps	1350 KW
Vent Fans & Air Handlers (Office Floors)	70 KW
Boilers (Gas-Fired)	30 KW
Fan Coil Units - Apartments	150 KW
A.C. - Pool Area	25 KW
Garage Ventilation	40 KW

Plumbing Equipment

Fire Pumps	2 @ 100 HP
Booster Pumps	3 @ 75 HP
Sewage Evelators	10 HP
Sump Pumps	6 HP
Laundry Room Load - 50 Washing machines x1.5KWx.75	= 56 KW

Health Club - Misc Pumps	25
Sauna	20
Elevators 4 @ 25 HP, 4 @ 40 HP	260 KW

Load Summery

Apartments	1140 KW
Retail Stores	90 KW
Offices	490 KW
House Ltg.	160 KW

House Power:

HVAC = 1665 KW Total

Plumbing = 746 Total (Incl. fire pumps)

Laundry Room = 56 KW Total (Washing Machines)

Elevators = 260 HP Total (4 @ 25 HP, $ @ 40 HP)

Apartment Load Calculations

31 floors @ 15 Apts. = 465
1 floor @ 13 Apts. = 13

478 Apts. Total

Lighting Load : 451,488 sf x 3 w/sf = 1,354,464 w
Small Appliances : 475 x 3000 w. = 1,434,000 w

3,000 w @ 100%	= 3000w
117,000 w @ 35 %	= 40,950 w
2,668,464 w @ 25%	= 667,116 w
	711,066 w
Dishwashers 478 x 1200 w x 75%	= 430,200 w
Net Computed Load	1,141,266 w

Gas Cooking 1140 KW

$= \frac{1,414,266 \text{ w}}{800} = 1427$ Amps. 277/480 v.

Service Switch = 2000/1600

Fuel for heating shall be natural gas @ 16,000 MCF

234